FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (FFACO)
ERRATA SHEET

Corrective Action Unit (CAU) Number: 413

CAU Description: Clean Slate II Plutonium Dispersion (TTR)

The following corrections and clarifications apply to: Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion (TTR) Tonopah Test Range, Nevada

Environmental Management (EM) Nevada Program Document Number: DOE/NV--1598

Revision: 0

Original Document Issuance Date: October 2018

This errata sheet was issued under cover letter from Environmental Management (EM) Nevada Program on: April 2, 2019

Description of Change:	Justification:
1. Table J.2-2 – Change second column heading from "Activity Concentration in the Surface Soil (pCi/g)" to "Inhalation Dose Conversion Factor" and third column heading from "Total Activity in Displaced Soil (pCi)" to "Units". The corrected Table J.2-2 is attached.	1. Column headings were incorrect as originally published.

Table J.2-2
ICRP 72 (Adult) Dose Conversion Factors

Isotope	Inhalation Dose Conversion Factor	Units
Pu-238	0.407	mrem/pCi
Pu-239/240	0.444	mrem/pCi
Pu-241	0.00851	mrem/pCi
Am-241	0.3552	mrem/pCi
Th-232	0.407	mrem/pCi

Environmental
Management
Nevada Program

DOE/NV--1598

Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion (TTR) Tonopah Test Range, Nevada

Controlled Copy No.: _____
Revision No.: 0

October 2018

U.S. Department of Energy
Environmental Management Nevada Program

Available for sale to the public from:

U.S. Department of Commerce
National Technical Information Service
5301 Shawnee Road
Alexandria, VA 22312
Telephone: 800.553.6847
Fax: 703.605.6900
E-mail: *orders@ntis.gov*
Online Ordering: *http://www.ntis.gov/help/ordermethods.aspx*

Available electronically at *http://www.osti.gov/scitech*

Available for a processing fee to U.S. Department of Energy and its contractors, in paper, from:

U.S. Department of Energy
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831-0062
Phone: 865.576.8401
Fax: 865.576.5728
Email: *reports@adonis.osti.gov*

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

DOE/NV--1598

CLOSURE REPORT FOR CORRECTIVE ACTION UNIT 413: CLEAN SLATE II PLUTONIUM DISPERSION (TTR) TONOPAH TEST RANGE, NEVADA

U.S. Department of Energy,
Environmental Management Nevada Program
Las Vegas, Nevada

Controlled Copy No.: ______

Revision No.: 0

October 2018

CLOSURE REPORT
FOR CORRECTIVE ACTION UNIT 413:
CLEAN SLATE II PLUTONIUM DISPERSION (TTR)
TONOPAH TEST RANGE, NEVADA

Approved by: /s/ Kevin J. Cabble Date: 10/25/2018

Kevin J. Cabble
Soils Activity Lead
EM Nevada Program

Approved by: /s/ Wilhelm R. Wilborn Date: 10/25/2018

Wilhelm R Wilborn
Deputy Program Manager, Operations
EM Nevada Program

Table of Contents

List of Figures v
List of Tables viii
List of Acronyms and Abbreviations ix
Executive Summary ES-1

1.0 Introduction 1
1.1 Purpose 3
1.2 Scope 3
1.3 CR Contents 5
1.3.1 Applicable Programmatic Plans and Documents 6
1.3.2 Data Quality Objectives 7
1.3.3 Data Quality Assessment Summary 7

2.0 Closure Activities 8
2.1 Description of Corrective Action Activities 8
2.1.1 SG1 (Undisturbed Areas) 8
2.1.2 SG5 (Buried Debris) 11
2.2 Deviations from CADD/CAP as Approved 16
2.3 Corrective Action Schedule as Completed 17
2.4 Site Plans/Survey Plat 17

3.0 Waste Disposition 18
3.1 Generated Wastes 18
3.2 Waste Characterization and Disposal 20

4.0 Closure Verification Results 21
4.1 Data Quality Assessment 21
4.1.1 Review DQOs and Sampling Design 23
4.1.1.1 DQO Decision Statement 23
4.1.1.1.1 DQO Provisions To Limit False-Negative Decision Error 24
4.1.1.1.2 DQO Provisions To Limit False-Positive Decision Error 27
4.1.1.2 Alternative Actions to the Decision 28
4.1.1.3 Sampling Design 28
4.1.2 Conduct a Preliminary Data Review 28
4.1.3 Select the Test and Identify Key Assumptions 28
4.1.4 Verify the Assumptions 29
4.1.5 Other DQO Commitments 29
4.1.6 Draw Conclusions from the Data 30
4.1.7 Data Quality for Decision-Supporting Data 31

Table of Contents *(Continued)*

4.1.7.1 FIDLER Radiological Surveys 31
4.1.7.2 Removable Contamination Surveys 31
4.2 Use Restrictions 32

5.0 Conclusions and Recommendations 33

6.0 References. 34

Appendix A - DQOs as Developed in the CADD/CAP

Appendix B - Closure Certification

B.1.0 Closure Certification. B-1

Appendix C - As-Built Documentation

C.1.0 As-Built Documentation C-1

Appendix D - Confirmation Sampling Test Results

D.1.0 Introduction. D-1

D.2.0 Closure Verification Activities D-2

D.2.1 Radiological Surveys D-2
D.2.2 Soil Sampling D-2
D.2.3 Removable Contamination Surveys D-5
D.2.4 Dose Calculations D-5
D.2.5 Comparison to Action Levels D-6

D.3.0 SG1, Undisturbed Areas D-7

D.3.1 Closure Activities D-7
D.3.1.1 Radiological Surveys D-7
D.3.1.2 Soil Samples D-7
D.3.1.3 Removable Contamination Surveys D-11
D.3.2 Nature and Extent of COCs D-11

D.4.0 SG5, Buried Debris. D-13

D.4.1 Closure Activities D-13
D.4.1.1 Visual Surveys D-13
D.4.1.2 Geophysical Surveys D-15
D.4.1.3 Radiological Surveys D-18
D.4.1.4 Soil Samples D-18

Table of Contents *(Continued)*

D.4.1.5 Removable Contamination Surveys D-19
D.4.2 Nature and Extent of COCs D-20

D.5.0 Quality Assurance D-21

D.5.1 Data Validation D-21
D.5.2 QC Samples D-22
D.5.3 Field Nonconformances D-22
D.5.4 Laboratory Nonconformances D-22

D.6.0 Summary D-23

D.7.0 References D-24

Appendix E - Waste Disposition Documentation

Appendix F - Modifications to the Post-Closure Plan

F.1.0 Modifications to the Post-closure Plan F-1

Appendix G - Analytical Test Results

G.1.0 Analytical Test Results G-1

Appendix H - Verification Sample Location Coordinates

H.1.0 Verification Sample Location Coordinates. H-1

Appendix I - Additional Operational Information about Excavation and Waste-Handling Activities

I.1.0 Additional Operational Information about Excavation
and Waste-Handling Activities I-1

I.1.1 Purpose I-1
I.1.2 Planning/Pre-Mobilization Activities I-1
I.1.3 Mobilization I-3
I.1.4 Site Preparation I-4
I.1.5 Radiological Control I-4
I.1.6 Excavation Activities I-5
I.1.7 Size Reduction of Large Debris Items/Other Unique Debris Items I-6
I.1.8 Waste Management Activities I-6
I.1.9 Transportation of Waste Containers I-7
I.1.10 Summary of Waste Volumes Dispositioned I-7

Table of Contents (Continued)

I.1.11 Additional Verification I-8
I.1.12 Grading of Excavated Areas I-8
I.1.13 Photos I-8

I.2.0 References I-22

Appendix J - Theoretical Inadvertent Ordnance Drop Dose Evaluation

J.1.0 Theoretical Worst-Case Inadvertent Ordnance Drop Dose Evaluation J-1

J.2.0 References J-4

Appendix K - Nevada Division of Environmental Protection Comments

List of Figures

Number	Title	Page
1-1	CAU 413 Location Map	2
1-2	CAU 413 Corrective Action Boundaries (Zones)	4
2-1	SG1, Excavation of Buried Debris in Zone 4 (Zones 1a and 1b in Background) Facing Southeast	10
2-2	SG1, Excavation of Buried Debris in Zone 4 (in the Vicinity of Zones 2 and 3) Facing Southeast	10
2-3	SG1, RMA FIDLER Survey (BMP)	12
2-4	SG5, Zone 5 Conduit Pipe Debris Removed as BMP Facing East	13
2-5	SG5, Example of Metal Scrap Excavated at Small Subsurface Anomaly Facing West	14
2-6	SG5, Zone 4 Post-Excavation Facing East	15
2-7	SG5, Zone 6 Post-Excavation Facing East	16
4-1	Final FIDLER Survey Results Following Corrective Actions	22
D.2-1	CAU 413 Pre-Corrective Action FIDLER Survey Results	D-3
D.2-2	CAU 413 Post-Corrective Action FIDLER Survey Results and Final CABs	D-4
D.3-1	Final FIDLER Survey Results at SG1	D-8
D.3-2	FIDLER Survey Results, Soil Sample Locations, and TED at SG1	D-9
D.3-3	FIDLER Survey Results, Soil Sample Locations, and TED at SG1 and SG5	D-10
D.4-1	SG5, Debris Removed from Zone 4 Facing Northwest	D-14
D.4-2	SG5, Additional Debris Removed from Zone 4 Facing South	D-14
D.4-3	SG5, Geophysical Survey Pre- and Post-Debris Removal	D-16
D.4-4	SG5, Post-Debris Removal Geophysical Survey Results	D-17
I.1-1	Site Layout	I-2

List of Figures (Continued)

Number	Title	Page
I.1-2	Mock-up Using Bag-Filling Bucket (clean soil) Facing North	I-9
I.1-3	Mock-up of Loading Bags with Clean Soil Facing North	I-9
I.1-4	Mock-up Moving Bags Suspended from Lifting Frame Facing North	I-10
I.1-5	Mock-up Dust Suppression Facing North	I-10
I.1-6	Site Setup Pad Grading and Dust Suppression Facing Southeast	I-11
I.1-7	Loading Frames Prepared for Waste Packaging Facing South	I-11
I.1-8	Overview of Site Layout Facing Southeast	I-12
I.1-9	Dust-Suppression Activities in Site Support Area Facing Southeast	I-12
I.1-10	Example of PPE and Low-Volume Air Sampler Facing South	I-13
I.1-11	Excavation Activities Facing Southeast	I-13
I.1-12	Debris Excavation Activities Facing Southeast	I-14
I.1-13	Soil Excavation Activities Facing Southeast	I-14
I.1-14	Remediated Area with Debris in Background Facing Southeast	I-15
I.1-15	Debris Size Reduction Using Hydraulic Hammer Facing Northeast	I-15
I.1-16	Size-Reduced Debris Facing Northeast	I-16
I.1-17	Verification Using Geophysical Surveys Facing Southeast	I-16
I.1-18	Filling Bags Using Bag-Filling Bucket Facing Northeast	I-17
I.1-19	Forklift Transferring Frame and Bag to Radiological Controlled Boundary Facing North	I-17
I.1-20	Closing and Securing Bag Facing Southeast	I-18
I.1-21	Moving Bag from Radiological Controlled Area to Staging Area Facing Southeast	I-18

List of Figures *(Continued)*

Number	Title	Page

I.1-22 Loading Bags on Flatbed Trailer for Transport to Area 5 RWMC for Disposal Facing Northwest I-19
I.1-23 Securing and Tarping Loaded Trailers for Transport Facing Northwest I-19
I.1-24 Waste Staging Area Facing North I-20
I.1-25 Truck Transporting Waste for Disposal Facing Northwest I-20
I.1-26 Decontamination of Front-End Loader Facing Northeast I-21

List of Tables

Number	Title	Page
2-1	SG1, Soil Volumes and Land Areas	8
2-2	SG5, Soil Volumes and Land Areas	16
2-3	Corrective Action Schedule for CAU 413	17
3-1	Waste Summary Table	19
4-1	Key Assumptions	29
D.3-1	TED for Sampled Locations at SG1	D-11
D.3-2	Removable Contamination Survey Results for Sample Plots at SG1	D-12
D.4-1	Summary of Anomalies	D-18
D.4-2	TED for Sampled Locations at SG5	D-19
D.4-3	Removable Contamination Survey Results for Sample Plots at SG5	D-19
G.1-1	Results for Gamma-Emitting Radionuclides Detected above MDCs	G-1
H.1-1	Verification Sample Location Coordinates for CAU 413	H-1
J.2-1	Potential Inhalation Dose from Ordnance Detonation at CSII Location of Maximum Residual Contamination	J-2
J.2-2	ICRP 72 (Adult) Dose Conversion Factors	J-3

List of Acronyms and Abbreviations

ALARA	As low as reasonably achievable
Am	Americium
bgs	Below ground surface
BMP	Best management practice
CA	Contamination area
CAA	Corrective action alternative
CAB	Corrective action boundary
CADD	Corrective action decision document
CAI	Corrective action investigation
CAIP	Corrective action investigation plan
CAP	Corrective action plan
CAS	Corrective action site
CAU	Corrective action unit
CD	Certificate of Disposal
CD-ROM	Compact disc-read only memory
cm	Centimeter
COC	Contaminant of concern
COPC	Contaminant of potential concern
cpm	Counts per minute
CR	Closure report
CSII	Clean Slate II
CSM	Conceptual site model
CW	Construction worker
day/yr	Days per year
DOE	U.S. Department of Energy
dpm/100 cm^2	Disintegrations per 100 square centimeters

List of Acronyms and Abbreviations *(Continued)*

DQA	Data quality assessment
DQI	Data quality indicator
DQO	Data quality objective
EM	Environmental Management
FAL	Final action level
FFACO	*Federal Facility Agreement and Consent Order*
FIDLER	Field instrument for the detection of low-energy radiation
ft	Foot
g	Gram
GIS	Geographic Information Systems
GPS	Global Positioning System
GZ	Ground zero
HCA	High contamination area
hr/day	Hours per day
ICRP	International Commission on Radiological Protection
in.	Inch
ISMS	Integrated Safety Management System
keV	Kiloelectron volt
kg/m^3	Kilograms per cubic meter
LLW	Low-level waste
m	Meter
m^2	Square meter
m^3	Cubic meter
m^3/hr	Cubic meters per hour
MDC	Minimum detectable concentration
MOB	Multiples of the background radiation level

List of Acronyms and Abbreviations *(Continued)*

mrem	Millirem
mrem/CW-yr	Millirem per Construction Worker year
mrem/yr	Millirem per year
mV	Millivolt
NAD	North American Datum
NDEP	Nevada Division of Environmental Protection
NIST	National Institute of Standards and Technology
NNSS	Nevada National Security Site
NNSSWAC	*Nevada National Security Site Waste Acceptance Criteria*
PCB	Polychlorinated biphenyl
pCi	Picocurie
pCi/g	Picocuries per gram
pCi/m^3	Picocuries per cubic meter
PPE	Personal protective equipment
Pu	Plutonium
QA	Quality assurance
QAP	Quality Assurance Plan
QC	Quality control
RBCA	Risk-based corrective action
RCRA	*Resource Conservation and Recovery Act*
RCT	Radiological control technician
RRMG	Residual radioactive material guideline
RWMC	Radioactive waste management complex
RWP	Radiological work permit
SCL	Sample collection log
SG	Study group

List of Acronyms and Abbreviations *(Continued)*

TCLP	Toxicity Characteristic Leaching Procedure
TED	Total effective dose
Th	Thorium
TLD	Thermoluminescent dosimeter
TTR	Tonopah Test Range
UR	Use restriction
USAF	U.S. Air Force
UTM	Universal Transverse Mercator
yd^3	Cubic yard

Executive Summary

This Closure Report (CR) presents information supporting the closure of Corrective Action Unit (CAU) 413: Clean Slate II Plutonium Dispersion (TTR), located on the Tonopah Test Range, Nevada. CAU 413 consists of the release of radionuclides to the surface and shallow subsurface from the conduct of the Clean Slate II storage-transportation test conducted on May 31, 1963. This CR complies with the requirements of the *Federal Facility Agreement and Consent Order* (FFACO) that was agreed to by the State of Nevada; U.S. Department of Energy (DOE), Environmental Management; U.S. Department of Defense; and DOE, Legacy Management. CAU 413 consists of one corrective action site: TA-23-02CS, Pu Contaminated Soil.

Closure activities were performed from October 2017 through July 2018, as set forth in the *Corrective Action Decision Document/Corrective Action Plan for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion (TTR)*; and in accordance with the *Soils Activity Quality Assurance Plan*, which establishes requirements, technical planning, and general quality practices. The purpose of this CR is to provide documentation and justification for the clean closure of CAU 413 under the FFACO without further corrective action. This justification is based on historical knowledge of the site, previous site investigations, closure activities conducted at the site, and the results of verification samples. Clean closure activities included excavating and disposing of radiologically contaminated soil and debris in the vicinity of ground zero, and collecting verification samples to support the corrective action of clean closure. Results confirmed that further corrective action is not required at CAU 413. Based on the corrective action activities conducted, clean closure of the site is complete; the closure objectives established in the CADD/CAP have been achieved; and no further corrective action at the site is required.

The corrective action of clean closure meets all applicable federal and state regulations for closure of the site under the FFACO. Based on the implementation of this corrective action, the DOE Environmental Management Nevada Program provides the following recommendations:

- No further corrective actions are necessary for CAU 413.
- The Nevada Division of Environmental Protection issue a Notice of Completion to the DOE Environmental Management Nevada Program for closure of CAU 413.
- CAU 413 be moved from Appendix III to Appendix IV of the FFACO.

1.0 Introduction

This Closure Report (CR) presents information supporting closure of Corrective Action Unit (CAU) 413, Clean Slate II Plutonium Dispersion (TTR), located on the Tonopah Test Range (TTR), Nevada. The location of CAU 413 is shown in Figure 1-1 and consists of one corrective action site (CAS):

- TA-23-02CS, Pu Contaminated Soil

CAU 413 consists of the release of radionuclides to the surface and shallow subsurface from the conduct of the Clean Slate II (CSII) storage-transportation test conducted on May 31, 1963. A detailed discussion of the history of this CAU is presented in the *Corrective Action Investigation Plan* (CAIP) *for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion (TTR)* (NNSA/NFO, 2016a). Because the CAU has only one CAS, the CAS nomenclature is generally not used in this CR. Instead, the CAS is referred to as CAU 413 throughout this document.

CAU 413 was divided into seven study groups based on similarities in the conceptual site model (CSM) properties of releases that would allow a common investigative approach. Corrective actions were performed at Study Group (SG) 1, Undisturbed Areas; and SG5, Buried Debris. Corrective actions were not required at the remaining study groups and will not be addressed in this document. See Section 2.1 of the CADD/CAP (DOE/EMNV, 2017a) for additional information on the study groups at CAU 413.

The corrective action alternative (CAA) of clean closure was selected as the recommended CAA for CAU 413 in the *Corrective Action Decision Document* (CADD)*/Corrective Action Plan* (CAP) (DOE/EMNV, 2017a). The corrective action of clean closure consists of the removal of soil and debris that exceed or are assumed to exceed the final action level (FAL) of 25 millirem per Construction Worker year (mrem/CW-yr). For SG1 and SG5, this alternative would remove all material in areas defined in the CADD/CAP as requiring further corrective action. Contaminated soil and debris would be disposed of at an offsite facility, and excavated areas would be backfilled and recontoured. For convenience in conducting the corrective actions at CAU 413, the areas requiring corrective action (corrective action boundaries [CABs]) were identified as Zones 0 through 3 in SG1 and Zones 4 through 6 in SG5 (Figure 1-2). Zone 1 was split into Zones 1a and 1b for nuclear safety

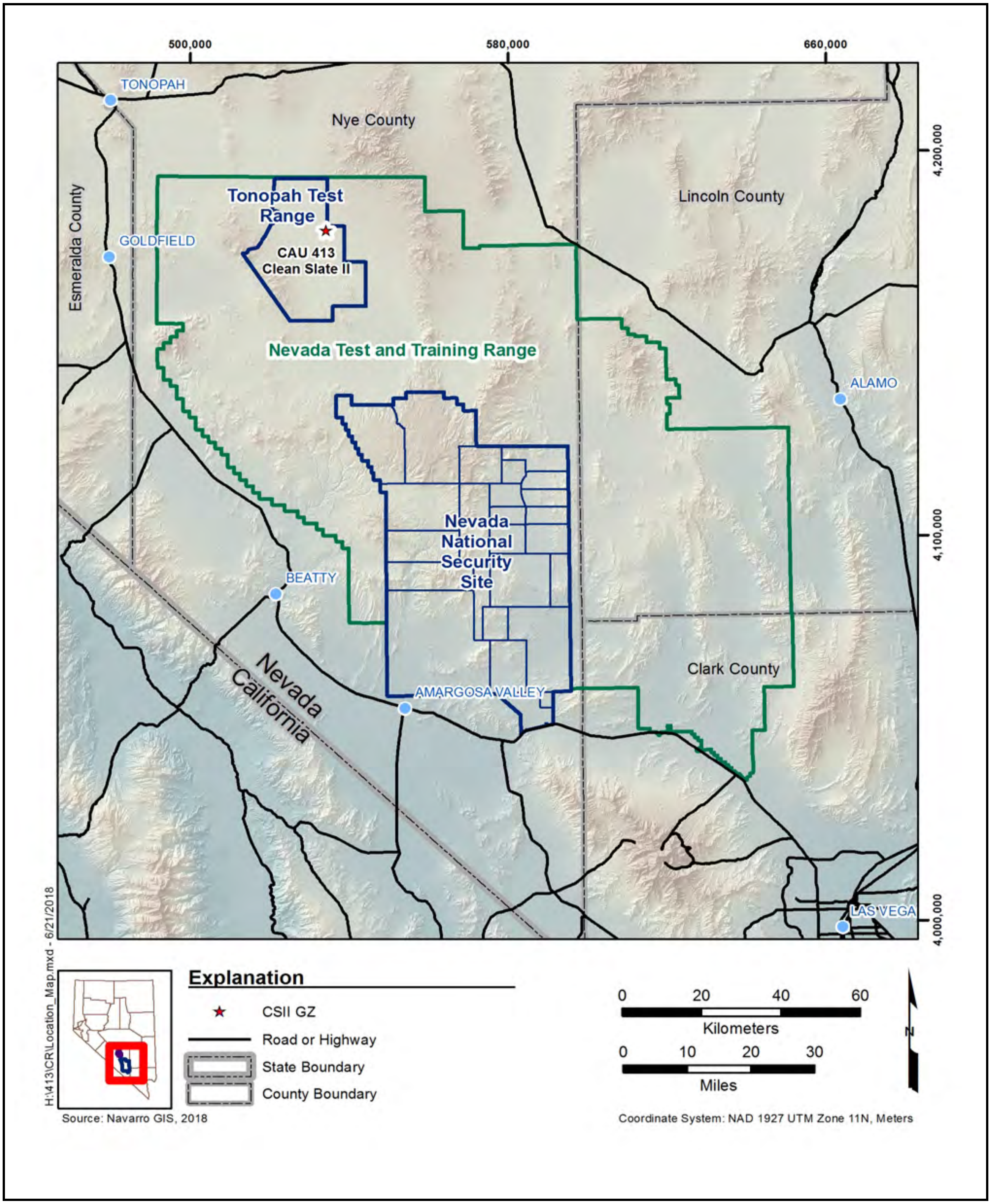

Figure 1-1
CAU 413 Location Map

control purposes. Zone 5 was determined not to require corrective action, and debris removal in this Zone was conducted as a best management practice (BMP).

As determined in the data quality objectives (DQOs) and documented in the CAIP (NNSA/NFO, 2016a), a Construction Worker (CW) land use scenario was determined applicable to the CAU 413 site (Cornish, 2014). This scenario assumes primarily outdoor construction activities that may include road construction/maintenance, underground utilities excavation, and/or target or other structure placement in the vicinity of CAU 413. The most exposed individual in this scenario is defined as an adult construction worker who works at the site for 120 days per year (day/yr), 8 hours per day (hr/day), for a total of 960 hours per year (hr/yr).

The corrective actions described in this document were implemented in accordance with the *Federal Facility Agreement and Consent Order* (FFACO) (1996, as amended) that was agreed to by the State of Nevada; U.S. Department of Energy (DOE), Environmental Management; U.S. Department of Defense; and DOE, Legacy Management.

1.1 Purpose

The purpose of this CR is to provide documentation and justification that no further corrective action is needed for the closure of CAU 413 based on the implementation of corrective actions. This includes a description of closure activities that were performed for the areas that require corrective action and an evaluation of the verification data. The CADD/CAP (DOE/EMNV, 2017a) identifies the areas that require corrective action, provides information relating to the selection of CAAs, and provides the reasoning behind their selection. Therefore, that information will not be repeated in this document.

1.2 Scope

The scope of this CR is to provide the information identified in the CADD/CAP (DOE/EMNV, 2017a) as being necessary to resolve the corrective action DQO decision: “Do contaminants of concern (COCs) remain following completion of the corrective action removal activities?” “If COCs are not present in the remaining material following completion of the corrective action removal activities, further corrective action is not required.” As presented in the CADD/CAP, the resolution of

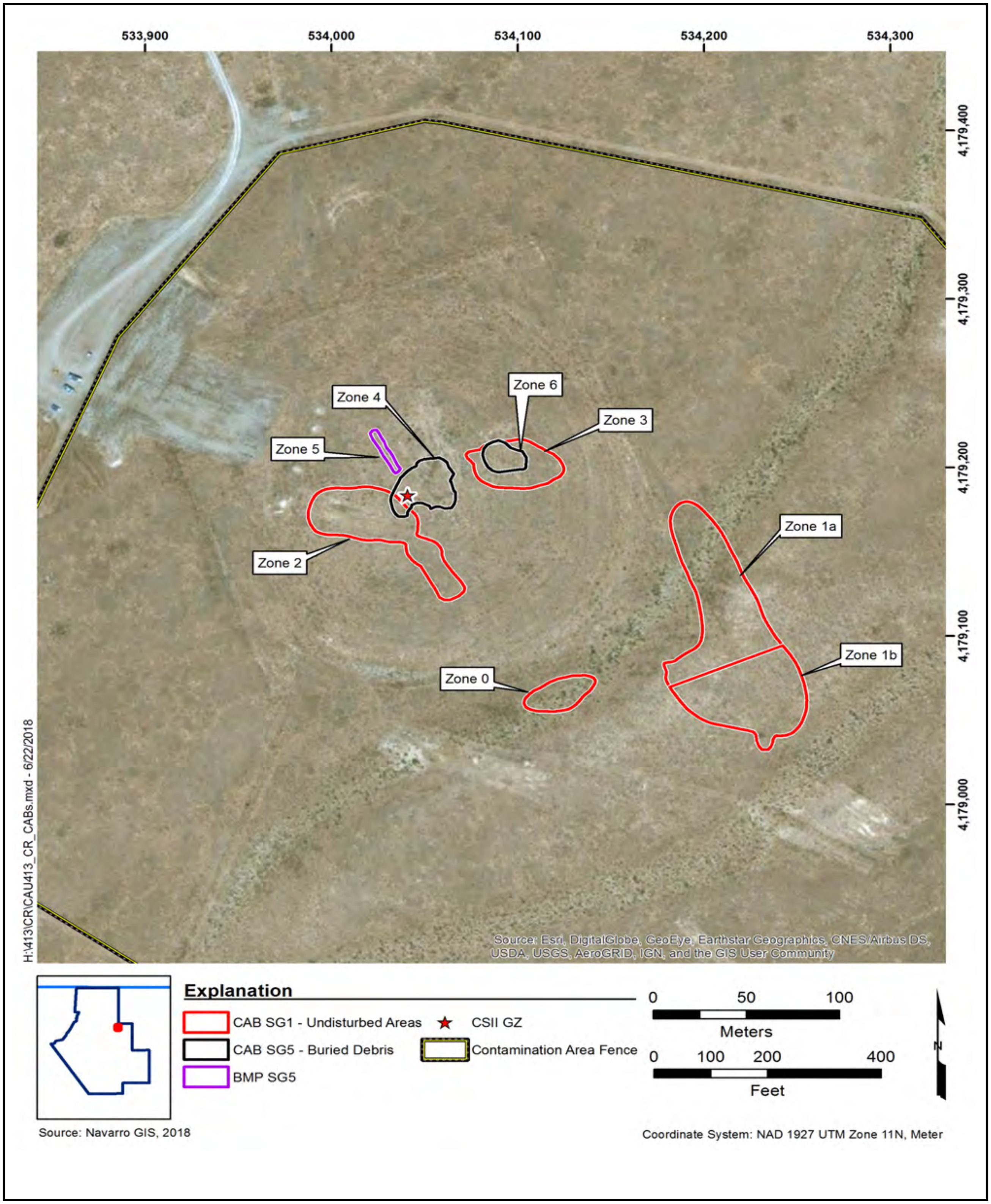

Figure 1-2
CAU 413 Corrective Action Boundaries (Zones)

the DQO decision for each excavated area was based on analytical soil sample results. The sample results presented herein demonstrate that COCs do not remain following completion of the corrective actions.

Results from field instrument for the detection of low-energy radiation (FIDLER) surveys, removable contamination surveys (i.e., stomp and tromp surveys), visual surveys, and geophysical surveys are also presented herein as supporting information. To ensure samples were collected in the areas most likely to contain a COC (if present), sample locations were selected as the most elevated relative FIDLER readings. Removable contamination surveys (stomp and tromp surveys) are reported for these sample locations to ensure high contamination area (HCA) conditions are not present. Visual, radiological, and geophysical surveys are discussed as used to guide excavation activities.

The closure activities were completed in accordance with the CADD/CAP (DOE/EMNV, 2017a) and in accordance with the *Soils Activity Quality Assurance Plan* (QAP) (DOE/EMNV, 2017b) and approved quality assurance (QA) programs, which establish requirements, technical planning, and general quality practices. The verification sample results and the risk associated with site contamination were evaluated in accordance with the *Soils Risk-Based Corrective Action* (RBCA) *Evaluation Process* (NNSA/NFO, 2014).

1.3 CR Contents

This CR is divided into the following sections and appendices:

- Section 1.0, “Introduction,” summarizes the purpose, scope, and contents of this CR.
- Section 2.0, “Closure Activities,” summarizes the closure activities, deviations from the CADD/CAP, the actual schedule, and the site conditions following completion of corrective actions.
- Section 3.0, “Waste Disposition,” discusses the wastes generated and entered into an approved waste management system as a result of the corrective action.
- Section 4.0, “Closure Verification Results,” describes verification activities and results.
- Section 5.0, “Conclusions and Recommendations,” provides the conclusions and recommendations along with the rationale for their determination.

- Section 6.0, "References," provides a list of all referenced documents used in the preparation of this CR.
- Appendix A, *DQOs as Developed in the CADD/CAP*, provides the DQOs as presented in Appendix B of the CAU 413 CADD/CAP.
- Appendix B, *Closure Certification*, documents the specific closure activities completed for the CAU.
- Appendix C, *As-Built Documentation*, identifies the as-built drawings for CAU 413.
- Appendix D, *Confirmation Sampling Test Results*, provides a description of the verification sampling activities and closure results.
- Appendix E, *Waste Disposition Documentation*, documents disposal of items removed during closure activities.
- Appendix F, *Modifications to the Post-Closure Plan*, documents any modifications to the Post-closure Plan.
- Appendix G, *Analytical Test Results*, presents the analytical results for the soil samples collected at CAU 413.
- Appendix H, *Verification Sample Location Coordinates*, provides the coordinates of the sample locations.
- Appendix I, *Additional Operational Information about Excavation and Waste Handling Activities*, summarizes the various planning and operational activities that occurred throughout the CAU 413 project.
- Appendix J, *Theoretical Inadvertent Ordnance Drop Dose Evaluation*, evaluates the dose resulting from an inadvertent ordnance dropped into the area of maximum contamination at CAU 413 after completion of corrective action activities.
- Appendix K, *Nevada Division of Environmental Protection* (NDEP) *Comments*, contains responses to NDEP comments on the draft version of this document.

1.3.1 Applicable Programmatic Plans and Documents

The following programmatic plans and other documents support the corrective action activities performed:

- CADD/CAP for CAU 413, Clean Slate II Plutonium Dispersion (TTR) (DOE/EMNV, 2017a)
- Soils QAP (DOE/EMNV, 2017b)

- Soils RBCA document (NNSA/NFO, 2014)
- FFACO (1996, as amended)

1.3.2 Data Quality Objectives

This section contains a summary of the DQO process that is presented in Appendix A. The DQOs were developed to identify data needs, clearly define the intended use of the environmental data, and design a data collection program that will satisfy these purposes.

The problem statement for CAU 413 is as follows: "Verification information is required to determine whether COCs are present after implementation of corrective action at CAU 413." To address this problem, the resolution of the decision statement is required:

- "Do COCs remain following completion of the corrective action removal activities?" For the purposes of these DQOs, a COC is defined as the presence of contamination exceeding the FALs established in the CADD/CAP (DOE/EMNV, 2017a) or the presence of removable contamination exceeding the threshold for establishing an HCA.

After removal actions, if COCs are not present, further corrective action is not required. If COCs are present, additional contamination will be removed.

1.3.3 Data Quality Assessment Summary

The CADD/CAP (DOE/EMNV, 2017a) contains the DQOs as agreed to by stakeholders before the implementation of closure activities. These DQOs are for the removal of soil and debris containing COCs and analytical sampling required to verify that clean closure activities were sufficient to reduce contamination below FALs. The DQO process ensures that the right type, quality, and quantity of data will be available to support the resolution of those decisions with an appropriate level of confidence. A data quality assessment (DQA) was conducted that evaluated the degree of acceptability and usability of the reported data in the decision-making process. This DQA is presented in Section 4.1. Using both the DQO and DQA processes helps to ensure that DQO decisions are sound and defensible.

The verification data support the CSM assumptions, and the data collected met the DQOs and support their intended use in the decision-making process. Based on this assessment, the verification data were adequate to verify the completion of corrective actions.

2.0 Closure Activities

The CADD/CAP (DOE/EMNV, 2017a) identified the corrective action for CAU 413 as clean closure. In order to achieve clean closure, soil and debris exceeding FALs were removed from multiple locations, and verification samples were collected. Results of the verification sampling for CAU 413 are presented Appendix D.

2.1 Description of Corrective Action Activities

As discussed in the CADD/CAP (DOE/EMNV, 2017a), corrective action is required at SG1 and SG5.

2.1.1 SG1 (Undisturbed Areas)

Contaminated surface soil was removed from the five corrective action zones identified in Section 1.0 for SG1 (Zones 0, 1a, 1b, 2, and 3). Zone 1 was split into two areas (Zone 1a and 1b) for nuclear safety reasons. The surface soil within each zone was excavated to a depth of approximately 10 centimeters (cm) and disposed of as low-level waste (LLW) at the Area 5 Radioactive Waste Management Complex (RWMC) (see Appendix E for waste disposal documentation). During soil removal in Zone 3, buried metallic and concrete debris were identified. Due to the extent, this buried debris was identified as Zone 6 and is discussed in Section 2.1.2 (SG5, Buried Debris). See Table 2-1 for the volume of soil removed from the zones in SG1 and the total area of land surface encompassed by the excavated zones.

Table 2-1
SG1, Soil Volumes and Land Areas

Zone	Approximate Volume of Soil Removed (m^3)	Total Surface Area (acres)
Zone 0	61	0.134
Zone 1a	388	0.787
Zone 1b	279	0.641
Zone 2	469	0.519
Zone 3	354	0.276

m^3 = Cubic meter

Once the contaminated surface soil was removed from each zone in SG1, as prescribed in the CADD/CAP (DOE/EMNV, 2017a), completion of the corrective action was verified by collecting soil samples from areas most likely to contain a COC. A FIDLER survey was performed within each of the remediated zones, out to a minimum distance of 2 meters (m) beyond each excavation boundary, to identify the location of highest remaining radioactivity within each of the five excavated zones in SG 1 (see Figure D.3-1). At the location of highest remaining detected activity within each zone, one soil sample plot was established. Each sample plot measured 10 by 10 m, and samples were collected using the methodology defined in the Soils RBCA document for sample plots (NNSA/NFO, 2014). One composite sample composed of nine aliquots was collected from each sample plot and analyzed for gamma spectroscopy. One duplicate sample was collected from sample plot X07 within Zone 0 as required in the CADD/CAP (DOE/EMNV, 2017a). Soil sample locations and sample numbers are presented in Table D.3-1.

Results of this sampling indicated that there was no surface radiological contamination above FALs within Zones 0 or 3. However, it was determined that surface contamination within Zones 1a, 1b, and 2 still exceeded the FAL of 25 mrem/CW-yr. Therefore, additional surface soil was removed from these zones. Following additional soil removal, another FIDLER survey was conducted, and sample plots were established within the areas of highest detected activity within Zones 1a, 1b, and 2. Results of this sampling indicated that there was no remaining surface radiological contamination above FALs within Zones 1a, 1b, or 2. See Table D.3-1 for final sample results (total effective dose [TED]) from the zones in SG1. Figure 2-1 shows excavation activities within Zone 4 (discussed in SG5), with Zones 1a and 1b visible in the background (cleared area). Figure 2-2 shows excavation activities in the vicinity, with the cleared area of Zone 2 visible on the right, and the cleared area of Zone 3 visible on the left.

Additionally, within the boundaries of each sample plot established at SG1, removable contamination surveys were conducted to verify that HCA conditions no longer exist (per the CADD/CAP). Results of these surveys, presented in Table D.3-2, showed that HCA conditions are not present within the zones at SG1.

Additionally, an area identified in Section 2.2.1.6 of the CADD/CAP (DOE/EMNV, 2017a) measuring approximately 120 square meters (m^2) and delineated as an radioactive material area

03/07/2018 (PIRDY-57-219534)

Figure 2-1
SG1, Excavation of Buried Debris in Zone 4 (Zones 1a and 1b in Background)
Facing Southeast

04/04/2018 (PIRDY-57-219502)

Figure 2-2
SG1, Excavation of Buried Debris in Zone 4 (in the Vicinity of Zones 2 and 3)
Facing Southeast

(RMA), was investigated and remediated as a BMP in October 2017. Approximately 6 cubic yards (yd^3) of surface soil was removed from the area and disposed of along with the soil from SG1. A post-excavation FIDLER survey was conducted within the former RMA, shown in Figure 2-3.

See Section D.3.1 for additional information on investigation activities at SG1. Results of the sampling effort are reported in Section D.3.1.2.

2.1.2 SG5 (Buried Debris)

Contaminated soil and debris were removed from the corrective action zones identified in Section 1.0 for SG5 (Zones 4 through 6). The extent of buried debris in Zones 4 and 5 were determined during the corrective actions as stipulated in the CADD/CAP (DOE/EMNV, 2017a). Within Zone 5, subsurface anomalies identified during the geophysical survey (see Figure D.4-3) were investigated, and it was determined that an approximate 2-inch (in.)-diameter metal conduit pipe containing electrical cable ran across the entire zone. This pipe is not within the CSM of SG5, as this study group was defined in the CAIP (NNSA/NFO, 2016a) as the release of contaminants to subsurface soil from contaminated soil and debris that was collected and buried at ground zero (GZ) after the CSII test in 1963 and covered with “several feet of clean earth” (AEC/NVOO, 1964). Although the specific purpose of the electrical conduit pipe is unknown, based on process knowledge and field-screening results, there is no reason to suspect that it is contaminated or requires corrective action. However, as a BMP, the pipe was removed and disposed of at the Area 5 RWMC (Figure 2-4).

During the excavation of buried debris within Zone 4, buried debris was identified that extended beyond the boundary delineated in the CADD/CAP (DOE/EMNV, 2017a). Therefore, the CAB for Zone 4 was modified (Figure 1-2). This additional debris identified was removed as part of the corrective action.

As discussed in Section 2.1.1, buried metallic and concrete debris were identified during surface soil excavation activities within Zone 3 (SG1). This buried debris was consistent with the definition and CSM of SG5 and was included in SG5 as Zone 6 (Figure 1-2). The buried debris within Zone 6 was removed as part of the corrective action. Because additional buried debris was identified during excavation activities, a geophysical survey within a much larger area around GZ was conducted to confirm that no other buried debris was present in the area. The geophysical survey did not identify

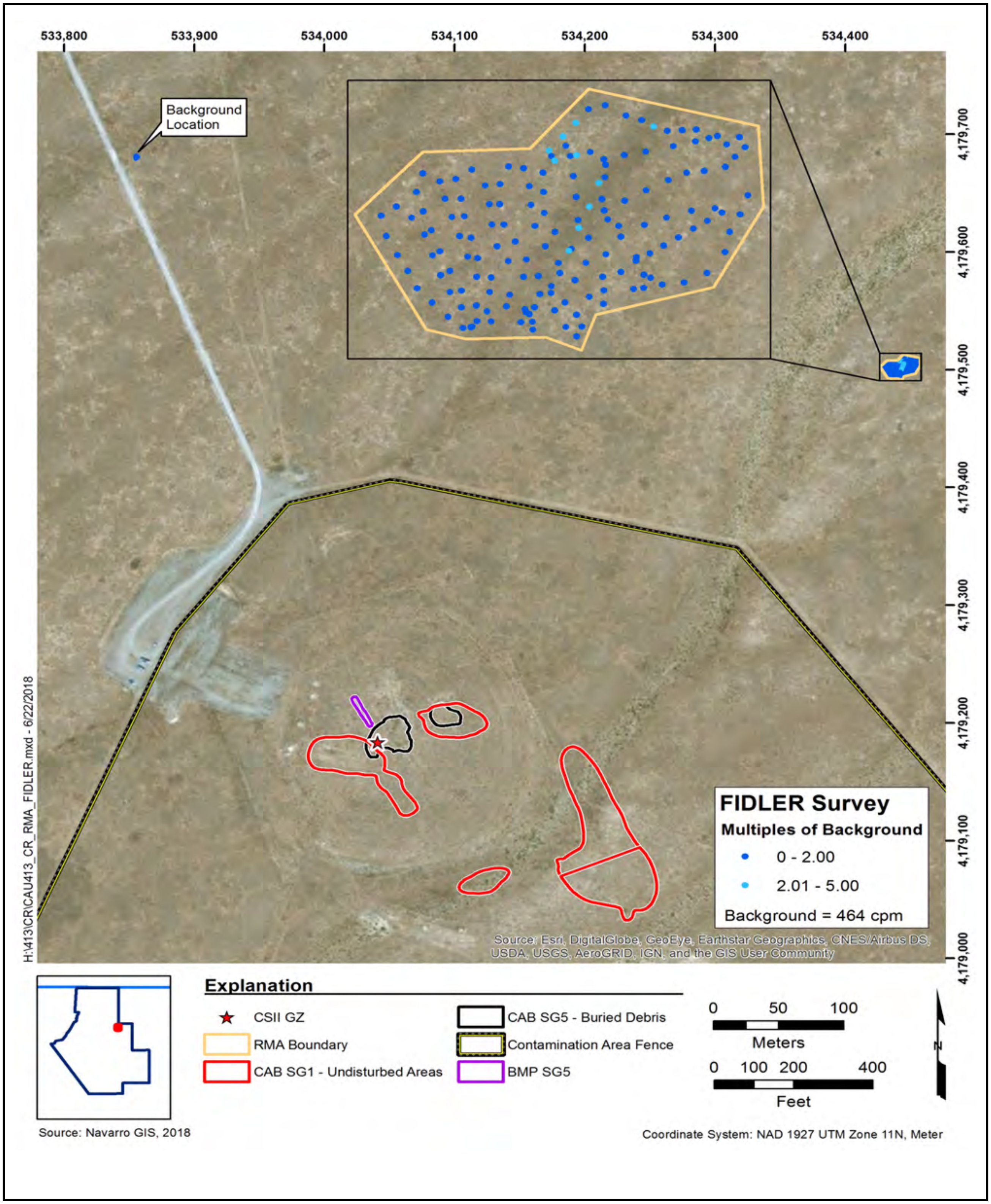

Figure 2-3
SG1, RMA FIDLER Survey (BMP)

05/03/2018 (PIRDY-57-220555)

Figure 2-4
SG5, Zone 5 Conduit Pipe Debris Removed as BMP Facing East

any other potential areas of buried debris (see Figure D.4-3). The geophysical survey did identify small anomalies of surface or near-surface debris around the GZ area of CAU 413. Radiological surveys in this area did not show elevated readings at these debris locations, and none of the debris had indications of contamination (i.e., black plating) that was seen on previously removed potential source material as described in Section 2.1.6 of the CADD/CAP. Because these debris items were not contaminated and were not buried in a landfill, they are not within the defined scope for SG5 (i.e., contaminated debris that was buried and covered) and, therefore, these items do not require corrective action. However, these debris items were removed and disposed of as LLW at the Area 5 RWMC as a BMP. Therefore, the anomalies associated with the uncontaminated debris items shown in Figures D.4-3 and D.4-4 are no longer present at the site. See Figure 2-5 for an example of metallic debris removed as a BMP from one of the small anomalies.

As stated in the CADD/CAP, the initial CABs were established for the purpose of planning. Actual CABs were revised based on post-excavation visual surveys, radiation surveys, geophysical surveys, and verification sample results. See Figure 1-2 for the final CABs.

06/16/2018 (PIRDY-57-220485)

Figure 2-5
SG5, Example of Metal Scrap Excavated at Small Subsurface Anomaly Facing West

As prescribed in the CADD/CAP (DOE/EMNV, 2017a), completion of this corrective action was verified by completing visual and geophysical surveys (discussed above) to verify debris has been removed, and collecting verification soil samples from areas most likely to contain a COC, using the FIDLER radiological survey. As previously discussed in this section, the conduit pipe in Zone 5 was not contaminated or buried in a landfill, and does not fit the CSM for SG5 (i.e., contaminated debris that was buried and covered). Therefore, it did not require corrective action or verification.

A FIDLER survey was performed within Zones 4 and 6 following debris excavation activities, out to a minimum distance of 2 m beyond each excavation boundary. These surveys were performed to identify the location of highest remaining radioactivity within the two excavated zones in SG5 (see Figure D.4-4). At the location of highest remaining detected activity within each zone, one soil sample plot was established. Each sample plot measured 10 by 10 m, and samples were collected using the methodology defined in the Soils RBCA document for sample plots (NNSA/NFO, 2014). One composite sample composed of nine aliquots was collected from each sample plot and analyzed for gamma spectroscopy. One duplicate sample was collected from sample plot X06 within Zone 6 as required in the CADD/CAP (DOE/EMNV, 2017a). See Table D.4-2 for final sample results (TED) from the zones in SG5. Figure 2-6 shows the excavation at Zone 4 following debris removal. Figure 2-7 shows the excavation at Zone 6 following debris removal.

05/15/2018 (PIRDY-57-220531)

Figure 2-6
SG5, Zone 4 Post-Excavation Facing East

See Table 2-2 for the volume of soil and debris removed from the zones in SG5 and the total area of land surface encompassed by the excavated zones. See Appendix I for additional details of excavation activities conducted at CAU 413.

Additionally, within the boundaries of each sample plot established at SG5, removable contamination surveys were conducted to verify that HCA conditions no longer exist (per the CADD/CAP). Results of these surveys, presented in Table D.4-3, showed that HCA conditions are not present within Zone 4 or Zone 6 at SG5.

See Section D.4.1 for additional information on investigation activities at SG5. Results of the sampling effort are reported in Section D.4.1.4.

03/01/2018 (PIRDY-57-219563)

Figure 2-7
SG5, Zone 6 Post-Excavation Facing East

Table 2-2
SG5, Soil Volumes and Land Areas

Zone	Approximate Volume of Soil and Debris Removed (m^3)	Total Surface Area (acres)
Zone 4	1,319	0.201
Zone 6	0.1 (debris only)	0.079

2.2 Deviations from CADD/CAP as Approved

At SG1 (Undisturbed Areas), during surface soil removal in Zone 3, buried metallic and concrete debris were identified. This area of buried debris was consistent with the CSM for buried debris, and corrective actions were implemented for this area as planned in the CADD/CAP for SG5 (Section 2.1.2). This is not considered to be a deviation, as the CADD/CAP included provisions for further delineation of areas of buried debris during the corrective action and the corrective actions were completed as described in the CADD/CAP (DOE/EMNV, 2017a). The identification and characterization of this buried debris did not have any impacts to DQO decisions.

Per the CADD/CAP, the spatial boundary for buried debris is 2 m below original ground surface. Some of the buried debris removed from Zones 4 and 6 extended below 2 m (to approximately 3 m below ground surface [bgs]). Although a portion of the buried debris extended below the CSM spatial boundary, it was clear that this buried material is consistent with the conceptual release of wastes originating from the CSII test, buried in trenches, and backfilled to ground level. Therefore, there is no reason to suspect that this waste is from a different source or has any other characteristics different than what is described in the CSM. There are no impacts to DQO decisions.

The CADD/CAP requirements (DOE/EMNV, 2017a) were met for this CAU. The information gathered during the CAI supports the CSM as presented in the CADD/CAP. Therefore, no revisions were necessary to the CSM.

2.3 Corrective Action Schedule as Completed

The CAU 413 site closure activities took place from October 2017 through July 2018. Table 2-3 presents a summary of these activities.

Table 2-3
Corrective Action Schedule for CAU 413

Date	Activity
September 2017 to October 2017	Site mobilization, site set-up, complete mock-ups and dry-runs
October 2017 to July 2018	Remediate, package soils and debris
December 2017 to July 2018	Shipment of LLW to RWMC in Area 5 at the NNSS
July 2018 to August 2018	Demobilization

NNSS = Nevada National Security Site

2.4 Site Plans/Survey Plat

As-built drawings were not required for CAU 413 closure activities. Verification sample locations are shown in Figures D.3-1 and D.4-4.

3.0 Waste Disposition

This section addresses the characterization, management, and disposition of remediation wastes generated at CAU 413. Waste management activities were conducted as specified in the CADD/CAP (DOE/EMNV, 2017a).

3.1 Generated Wastes

The wastes listed in Table 3-1 were generated during closure activities at CAU 413. Wastes were segregated to the greatest extent possible, and waste minimization techniques were integrated into the field activities to reduce the amount of waste generated. Controls were in place to minimize the use of hazardous materials and the unnecessary generation of hazardous and/or mixed waste.

The amount, type, and source of waste placed into each container were recorded in waste management records that are maintained in the CAU 413 file and submitted to a Records System that is compliant with DOE Order 243.1B, Administrative Change 1 (DOE, 2013). The executed waste shipping and disposal documentation for CAU 413 is included in Appendix E.

The following waste streams were generated during the closure activities:

- Contaminated soil and debris (LLW)
- Disposable personal protective equipment (PPE) (LLW)

The waste is described as radioactively contaminated soil and debris. The debris consists of concrete, wood, carbon-steel metal, and PPE generated during remediation activities at CAU 413. Within Zone 4, much of the debris included large concrete pieces (rebar reinforced) from the original bunker. These concrete pieces measured as large as 7 feet (ft) wide by 10 ft long by approximately 18 in. thick. A hydraulic hammer attached to a backhoe was used to rubblize the concrete, and the metal rebar within the concrete was cut using a band saw. This size reduction allowed for the packaging, transportation, and disposal of the debris.

Table 3-1
Waste Summary Table

Waste Stream	Waste Characterization				Waste Disposition			
	Hazardous	Hydrocarbon	PCBs	Radioactive	Disposal Facility	Waste Volume	Disposal Date	Disposal Doc[a]
Contaminated Soil and Debris	No	No	No	Yes	Area 5 RWMC	2,866.5 m^3	December 2017 through July 2018	CD

[a]Copies of waste disposal documents are located in Appendix E of this document.

CD = Certificate of Disposal
PCB = Polychlorinated biphenyl

3.2 Waste Characterization and Disposal

This waste was characterized based on analytical soil sample results presented in Appendix K of the CADD/CAP (DOE/EMNV, 2017a). The samples were submitted for the following radiochemical analysis: gamma spectroscopy, isotopic americium, isotopic plutonium, and isotopic uranium. These radiochemical results verified that there were several radioisotopes that exceed the Table 4-2 limits of the NNSS Radiological Control Manual (NNSA/NFO, 2012). Therefore, the waste was characterized as LLW.

Historical surface soil samples collected in 1996 from within the CSII radiological plume were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) volatile organic compounds, TCLP semivolatile organic compounds, TCLP metals, TCLP herbicides, and TCLP pesticides (NNSA/NSO, 2004). These sample results verified that no *Resource Conservation and Recovery Act* (RCRA) regulated hazardous constituents were present. Therefore, the waste has been characterized as non-hazardous, non-hydrocarbon impacted, and non-PCB contaminated.

Excavated soil and debris from corrective actions was containerized into 422 7-m^3 bulk soft-sided containers. The 422 waste containers were shipped in 211 truck shipments for disposal to the Area 5 RWMC in accordance with the requirements in the *Nevada National Security Site Waste Acceptance Criteria* (NNSA/NFO, 2016b).

4.0 Closure Verification Results

The corrective action of clean closure was implemented as specified in the CADD/CAP (DOE/EMNV, 2017a). Although residual contamination below FALs remains at the CSII site (see Figures D.3-2 and D.3-3), verification results demonstrate that COCs (contaminants present at concentrations greater than FALs) no longer exist within CAU 413. Verification soil samples were collected from Zones 1, 2, 3, 4, and 6 after completion of corrective action activities to verify that the site closure objectives had been achieved. Verification samples were not collected from Zone 5 as no COCs were identified in this zone. Results demonstrate that contaminants are not present in concentrations greater than the FALs, and no further corrective action is required for CAU 413. Removable contamination surveys were also completed in each zone to confirm HCA conditions were no longer present (see Section 4.1.7.2). The verification sample results are presented in Appendix D. Figure 4-1 shows a composite radiation survey representing residual radioactivity conditions at the CSII site following corrective actions.

To verify that the dataset obtained as a result of this investigation supports the DQO decisions, a DQA was conducted. Section 4.1 provides a summary of the DQA.

4.1 Data Quality Assessment

The DQA process is the scientific evaluation of the actual investigation results to determine whether the DQO criteria established in the CADD/CAP (DOE/EMNV, 2017a) were met and whether DQO decisions can be resolved at the desired level of confidence. The DQO process ensures that the right type, quality, and quantity of data will be available to support the resolution of those decisions at an appropriate level of confidence. Using both the DQO and DQA processes helps to ensure that DQO decisions are sound and defensible.

The DQA involves five steps that begin with a review of the DQOs and end with an answer to the DQO decisions. These steps are briefly summarized as follows:

1. *Review DQOs and Sampling Design*. Review the DQO process to provide context for analyzing the data. State the primary statistical hypotheses; confirm the limits on decision errors for committing false-negative (Type I) or false-positive (Type II) decision errors; and review any special features, potential problems, or any deviations to the sampling design.

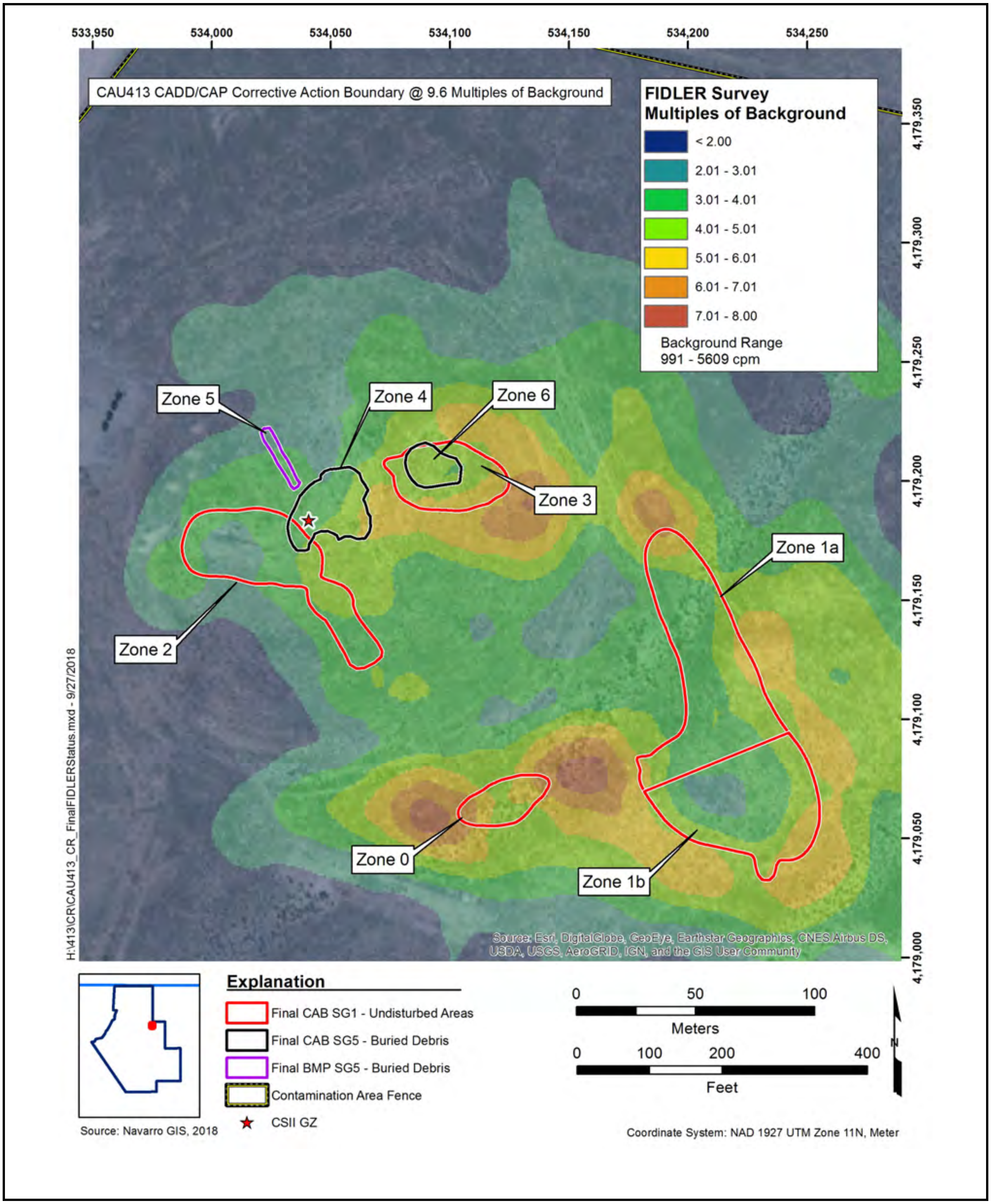

Figure 4-1
Final FIDLER Survey Results Following Corrective Actions

2. *Conduct a Preliminary Data Review*. A preliminary data review should be performed by reviewing QA reports and inspecting the data both numerically and graphically, validating and verifying the data to ensure that the measurement systems performed in accordance with the criteria specified, and using the validated dataset to determine whether the quality of the data is satisfactory.

3. *Select the Test*. Select the test based on the population of interest, population parameter, and hypotheses. Identify the key underlying assumptions that could cause a change in one of the DQO decisions.

4. *Verify the Assumptions*. Perform tests of assumptions. If data are missing or censored, determine the impact on DQO decision error.

5. *Draw Conclusions from the Data*. Perform the calculations required for the test.

The DQA presented in this document is only for the verification sample data generated during the closure activities for SG1 and SG5 as presented in Sections 2.1.1 and 2.1.2.

4.1.1 Review DQOs and Sampling Design

This section contains a review of the DQO process presented in Appendix A. The DQO decisions are presented with the DQO provisions to limit false-negative or false-positive decision errors. Special features, potential problems, or any deviations to the sampling design are also presented.

The FAL for radioactivity established in Appendix D of the CADD/CAP (DOE/EMNV, 2017a) was based on the annual dose limit of 25 millirem per year (mrem/yr) over an annual exposure time of 960 hours (i.e., the CW exposure scenario defines that a site worker would be exposed to site contamination 8 hr/day for 120 day/yr). To be comparable to these action levels, the CAU 413 investigation results are presented in terms of the dose a receptor would receive from site contamination under the CW (mrem/CW-yr) exposure scenario.

4.1.1.1 DQO Decision Statement

The DQO decision statement as presented in the CADD/CAP (DOE/EMNV, 2017a) is as follows: “Do COCs remain following completion of the corrective action removal activities?” Any contaminant that is present (or is assumed to be present) at levels that would cause it to exceed its corresponding FAL will be defined as a COC. If COCs are not present, further corrective action is not required. If COCs are present, additional contamination will be removed.

4.1.1.1.1 DQO Provisions To Limit False-Negative Decision Error

A false-negative decision error (when it is concluded that contamination exceeding FALs is not present when it actually is) was controlled by meeting the following criteria:

1) For the DQO decision statement, having a high degree of confidence that sample locations selected will identify COCs if present anywhere within the study group (judgmental sampling).

2) Having a high degree of confidence that analyses conducted will be sufficient to detect any COCs present in the samples.

3) Having a high degree of confidence that the dataset is of sufficient quality and completeness.

Criteria 1b, 2, and 3, were assessed based on the entire dataset. Therefore, these assessments apply to the DQO decision statement.

Criterion 1 (Confidence Judgmental Sample Locations Identify COCs)

To resolve the DQO decision statement (determine whether a COC is present at a release), samples were collected and analyzed following these two criteria:

- Samples must be collected in areas most likely to contain a COC.
- The analytical suite selected must be sufficient to identify any COCs present in the samples.

To satisfy the criteria that the samples must be collected in areas most likely to contain a COC, the judgmental sample locations were selected at the highest radiological readings as detected during the FIDLER ground-based radiological survey.

For each sample, sample aliquots from unbiased locations within the sample plot using an unbiased random-start, systematic triangular grid pattern. This permitted that all given locations within the boundaries of the sample plot would have an equal probability of being chosen.

The analytical methods were chosen during the DQO process as the analyses required to detect any of the contaminants of potential concern (COPCs) that were defined as the contaminants that could reasonably be expected at the site that could contribute to a dose or risk exceeding FALs. The analyses were identified based on the contaminants detected in the corrective action investigation

(CAI) samples as reported in the CADD/CAP (DOE/EMNV, 2017a). This provides assurance that the analyses conducted for each sample have the capability of identifying any COPC present in the sample. All samples were analyzed for gamma spectroscopy.

Criterion 2 (Confidence in Detecting COCs Present in Samples)

Sample results were assessed against the acceptance criterion for the data quality indicator (DQI) of sensitivity as defined in the Soils QAP (DOE/EMNV, 2017b). The sensitivity acceptance criterion is that analytical detection limits will be less than the corresponding FAL (DOE/EMNV, 2017a). For radionuclides, the criterion is that all detection limits are less than their corresponding CW residual radioactive material guideline (RRMG). All of the analytical result detection limits for every radionuclide were less than their corresponding RRMGs. Therefore, the DQI for sensitivity has been met for all contaminants, and no data were rejected due to sensitivity.

Criterion 3 (Confidence that Dataset is of Sufficient Quality and Complete)

To satisfy the third criterion, the dataset was assessed against the acceptance criteria for the DQIs of precision, accuracy, comparability, completeness, and representativeness, as defined in the Soils Activity QAP (DOE/EMNV, 2017b). The DQI acceptance criteria are presented in Section 1.5.5 of the Soils Activity QAP. The individual DQI results are presented in the following subsections.

Precision

Precision was evaluated as described in Sections 1.5.5 and 4.2 of the Soils Activity QAP (DOE/EMNV, 2017b). No data quality issues were identified for the analytical results that resulted in them being qualified for precision. Therefore, the criterion for precision was met for all contaminants. The potential for a false-negative DQO decision error is negligible, and the results can be confidently used for decision making.

Accuracy

Accuracy was evaluated as described in Section 4.2 of the Soils Activity QAP (DOE/EMNV, 2017b). No data quality issues were identified for the analytical results that resulted in them being qualified for accuracy. Therefore, the criterion of 80 percent accuracy was met for contaminants. The potential for a false-negative DQO decision error is negligible, and the results can be confidently used for decision making.

Representativeness

The DQO process as identified in the CADD/CAP (DOE/EMNV, 2017a) was used to address sampling and analytical requirements for the verification samples. During this process, the locations were selected that enabled the samples collected to be representative of the population parameters identified in the DQO (the most likely locations to contain contamination [judgmental sampling].

Special consideration is needed for americium and plutonium isotope concentrations related to representativeness. This is due to the nature of these contaminants in soil. These isotopes may be present in soil in the form of small particles that may or may not be captured in a small soil sample of 1 to 2 grams. As individual particles of these radionuclides can make a significant impact on analytical results, small soil samples taken from the same site can produce analytical results that are very different (i.e., poor accuracy). However, the americium (Am) and plutonium (Pu) isotopes are co-located (e.g., Am-241 is a daughter product of Pu-241), and the relative concentrations between different samples from the same site (i.e., the ratio of americium to plutonium isotope concentrations) should be equal. Based on process knowledge and demonstrated by analytical results from previously sampled Soils sites, the ratios between americium and plutonium isotopes in soil contamination from any given source is expected to be the same throughout the contaminant plume at any given time. Therefore, if the ratios are known and one of these isotopic concentrations is known, the concentrations of the other isotopes can be estimated.

Am-241 is reported by the gamma spectrometry method as well as the isotopic americium method. As the gamma spectrometry measurement is based on a much larger soil sample (usually 1 liter), the particle distribution problem discussed above is greatly diminished and the probability of the result being representative of the sampled site is much improved. Therefore, the ratios between the americium and plutonium isotopes were established using the isotopic analytical results from the CAI and these ratios were used to infer concentrations of plutonium isotopes using the gamma spectrometry results for Am-241. These inferred plutonium values will be more representative of the sampled area than the isotopic results.

Based on the selection of the sample locations and the use of americium and plutonium concentrations that are more representative of the sampled area, the analytical data acquired during the CAU 413 CAI are considered to adequately represent contaminant concentrations of the sampled population.

Comparability

Field sampling, as described in the CADD/CAP (DOE/EMNV, 2017a), was performed and documented in accordance with approved procedures that are comparable to standard industry practices. Approved analytical methods and procedures per DOE were used to analyze, report, and validate the data. These are comparable to other methods used not only in industry and government practices, but most importantly are comparable to other investigations conducted for the TTR. Therefore, CAU 413 datasets are considered comparable to other datasets generated using these same standardized DOE procedures, thereby meeting DQO requirements.

Also, standard, approved field and analytical methods ensured that data were appropriate for comparison to the investigation action levels specified in the CADD/CAP.

Completeness

The Soils Activity QAP (DOE/EMNV, 2017b) defines acceptable criteria for completeness to be that the dataset is sufficiently complete to be able to make the DQO decisions. This is initially evaluated as 80 percent of release-specific analytes identified having valid results. As none of the analytical results were rejected (either qualified as rejected or data that failed the criterion of sensitivity), the dataset for CAU 413 has met the general completeness criteria and sufficient information is available to make DQO decisions.

4.1.1.1.2 DQO Provisions To Limit False-Positive Decision Error

The false-positive decision error was controlled by assessing the potential for false-positive analytical results. QA/QC samples such as method blanks were used to determine whether a false-positive analytical result may have occurred. This provision is evaluated during the data validation process and appropriate qualifications are applied to the data when applicable. There were no data qualifications that would indicate a potential false-positive analytical result.

Proper decontamination of sampling equipment also minimized the potential for cross contamination that could lead to a false-positive analytical result.

4.1.1.2 Alternative Actions to the Decision

If COCs are not detected in verifications samples from the areas of removed soil and debris, further corrective action is not required. If COCs are detected, additional removal will be completed.

4.1.1.3 Sampling Design

The CADD/CAP (DOE/EMNV, 2017a) stipulated that the following sampling processes would be implemented:

- A judgmental scheme will be implemented to select survey and sample plot locations within the remediated areas at CAU 413. An unbiased sampling scheme will be implemented to select sample locations within the sample plot and evaluate the analytical results. At least one composite soil sample will be collected from each plot.

  Result. The location of the plots were selected judgmentally, based on the highest readings of the FIDLER surveys. Sample aliquots were collected within each plot as described in Section D.2.1. At least one composite soil sample was collected from each sample plot.

4.1.2 Conduct a Preliminary Data Review

A preliminary data review was conducted by reviewing QA reports and inspecting the data. The contract analytical laboratories generate a QA nonconformance report when data quality does not meet contractual requirements. All data received from the analytical laboratories met contractual requirements, and a QA nonconformance report was not generated. Data were validated and verified to ensure that the measurement systems performed in accordance with the criteria specified in the Soils Activity QAP (DOE/EMNV, 2017b). The validated dataset quality was found to be satisfactory.

4.1.3 Select the Test and Identify Key Assumptions

The test for making DQO decisions for radiological contamination was the comparison of the TED to the FAL of 25 mrem/CW-yr. All radiological FALs were based on an exposure duration to a site worker using the CW exposure scenario. Based on the results of all verification soil samples collected, the FAL is not exceeded at any verification sample location. The soil sample results are presented in Appendix D. The key assumptions that could impact a DQO decision are listed in Table 4-1.

Table 4-1
Key Assumptions

Exposure Scenario	Construction Worker
Affected Media	Surface and subsurface soil and debris
Location of Contamination/Release Points	Surface soil surrounding and downwind of GZ; subsurface soil and debris buried near GZ.
Transport Mechanisms	Wind may contribute to lateral transport through resuspension and redistribution of windborne contaminants; however, this transport mechanism is less likely to cause migration of contamination at levels exceeding the FAL. Mechanical disturbance during excavation operations may also serve to displace or redistribute contaminants.
Preferential Pathways	Wind is a minor force for migration.
Lateral and Vertical Extent of Contamination	Contamination is expected to have been initially contiguous to the release points. Concentrations are expected to generally decrease with distance and depth from the source. Lateral and vertical extent of contamination exceeding the FAL is assumed to be within the spatial boundaries.
Groundwater Impacts	None.
Future Land Use	Military
Other DQO Assumptions	None

4.1.4 Verify the Assumptions

The results of the investigation support the key assumptions identified in the CAU 413 DQOs and Table 4-1. All data collected during the closure verification activities supported the CSM, and no revisions to the CSM were necessary.

4.1.5 Other DQO Commitments

The CADD/CAP (DOE/EMNV, 2017a) made the following commitments:

- For SG1 and SG5, a minimum of one soil sample plot (each with a minimum of one sample per plot) will be established at the location of the highest radiological FIDLER survey values in each of the remediated areas. The survey will be conducted to a minimum of 2 m from the excavation boundary.

Result. One sample plot (each consisting of one composite sample) was established within each of the excavated zones (0, 1a, 1b, 2, 3, 4, and 6) at the location of highest radiological FIDLER survey values. At each zone, the FIDLER surveys were extended to a minimum of 2 m outward from the excavation boundary.

- Removable contamination surveys will be conducted at the sample plot areas to verify that HCA conditions no longer exist.

  Result. Removable contamination surveys were conducted at all verification sample plots within SG1 and SG5 to verify that HCA conditions no longer exist.

- For SG5, the excavation area will be visually assessed and a geophysical survey will be completed to verify that all visible debris has been removed.

  Result. Visual and geophysical surveys were conducted within both excavated zones at SG5, and no additional debris were identified.

- All samples collected for corrective action confirmation will be analyzed for gamma spectroscopy.

  Result. The samples collected from the sample plots at both SG1 and SG5 were analyzed for gamma spectroscopy.

- The dose at the sample plots will be calculated using the analytical results from the soil samples (thermoluminescent dosimeters [TLDs] will not be used to estimate external dose).

  Result. The dose at each sample plot was calculated using the analytical results from the soil samples.

4.1.6 Draw Conclusions from the Data

The DQO decision on the presence of COCs within the excavation zones was resolved based on the analytical results of samples collected at the soil sample plot locations within SG1 and SG5 and removable contamination surveys conducted within the sample plots. These results demonstrate that no COCs remain within these zones in concentrations exceeding FALs, and no further corrective action is necessary.

4.1.7 Data Quality for Decision-Supporting Data

The CADD/CAP (DOE/EMNV, 2017a) identified ground-based radiological survey data as decision-supporting data. The following subsections discuss the quality of these datasets, including FIDLER radiological surveys and removable contamination surveys.

4.1.7.1 FIDLER Radiological Surveys

The FIDLER data meet the data quality requirements listed in Section 2.6.1 of the Soils Activity QAP (DOE/EMNV, 2017b) through the verification of acceptable instrument performance. This was accomplished through the use of control charts and daily operational tests (performing daily background and response checks). This assures that the instrument responds appropriately to higher levels of radiation with correspondingly higher readings. The FIDLER readings are used qualitatively to represent radiation levels relative to the nearby background radiation level. These are expressed in terms of multiples of the background (MOB) radiation level. The qualitative MOB values are used to distinguish a spatial pattern of where radioactivity is relatively higher and lower. These values become semi-quantitative if a relationship is established between MOB values and quantitative dose levels that meets the quality criterion defined in the Soils RBCA document (NNSA/NFO, 2014).

FIDLER data were also used qualitatively to guide the biasing of sampling locations. As used for these purposes, the quality of FIDLER survey data is sufficient to meet the requirements of decision-supporting data.

4.1.7.2 Removable Contamination Surveys

The removable contamination surveys conducted within the sample plots used the “stomp and tromp” methodology. The survey method uses a tool to obtain a swipe sample of removable radioactive contamination from the ground surface. The sample is then analyzed by calibrated radiation instruments that undergo daily quality checks.

An assessment of this methodology was completed in 2000 (Tinney et al., 2000). The assessment concluded that the survey technique lacked verification and quality control (QC), and was likely overly conservative in determining removable soil contamination. A qualitative assessment of the technique showed that the results of the surveys, averaged over large areas, appeared to be reproducible within ±30 percent.

The results of the survey methodology are used as an indicator of the need to assume the radiological dose to an offsite receptor would exceed 25 mrem/yr. This assumption is necessary in the absence of a methodology to estimate the dose an offsite receptor could receive from the uncontrolled removal of removable contamination. The use of the removable contamination survey data is limited to only a qualitative indicator to implement the conservative assumption of the need for corrective action based on an unknown dose to an unknown receptor. When used in this manner, the quality of removable contamination survey data is sufficient to meet the requirements as decision-supporting data.

4.2 Use Restrictions

For site closure under the FFACO, use restrictions (URs) are required when contamination is left on site above action levels or as site-specific conditions warrant. Because no locations at CAU 413 exceed the FAL using the CW exposure scenario and site closure objectives have been achieved, no further corrective action is required, and FFACO URs are not necessary. The corrective actions for CAU 413 are based on the assumption that activities at this site will be limited to those that are industrial in nature and that the U.S. Air Force (USAF) will maintain controlled access (i.e., restrict public access and residential use). Should the future land use change such that these assumptions are no longer valid, additional evaluation may be necessary.

5.0 Conclusions and Recommendations

Corrective actions for CAU 413 were implemented as presented in the CADD/CAP (DOE/EMNV, 2017a). CAU 413 was clean closed by excavation and disposal of the contaminated soil and debris exceeding the FAL within SG1 and SG5. Following soil and debris removal, radiological surveys and verification soil samples confirmed that contamination exceeding FALs is not present. No further corrective action is required at CAU 413 based upon the implementation of the corrective action of clean closure.

Upon completion of excavation activities at CAU 413, excavated areas were backfilled and recontoured. As a BMP, the fencing will be restored at USAF request.

The corrective actions for CAU 413 are based on the assumption that activities at CAU 413 will be limited to those that are industrial in nature and that controlled access (i.e., restrict public access and residential use) will be maintained. Should the future land use of CAU 413 change such that these assumptions are no longer valid, additional evaluation may be necessary.

The DOE Environmental Management (EM) Nevada Program requests that NDEP issue a Notice of Completion for this CAU and approve transferring the CAU from Appendix III to Appendix IV of the FFACO. DOE, under its regulatory authority for management of radioactive waste materials associated with environmental remediation activities, approves these actions (USC, 2012).

6.0 References

AEC/NVOO, see Atomic Energy Commission, Nevada Operations Office.

Atomic Energy Commission, Nevada Operations Office. 1964. *Project Manager's Report, Project Roller Coaster*, NVO-10. Prepared by Reynolds Electrical & Engineering Co., Inc. Las Vegas, NV.

Cornish, Col. B.R., U.S. Air Force, 99 ABW/CC. 2014. Letter to R.F. Boehlecke (NNSA/NFO) titled "Air Force Response to DOE Request to Close Five Radiological Sites on the NTTR," 2 May. Nellis AFB, NV.

DOE, see U.S. Department of Energy.

DOE/EMNV, see U.S. Department of Energy, Environmental Management Nevada.

FFACO, see *Federal Facility Agreement and Consent Order*.

Federal Facility Agreement and Consent Order. 1996 (as amended March 2010). Agreed to by the State of Nevada; U.S. Department of Energy, Environmental Management; U.S. Department of Defense; and U.S. Department of Energy, Legacy Management. Appendix VI, which contains the Soils Sites Strategy, was last modified June 2014, Revision No. 5.

Navarro GIS, see Navarro Geographic Information Systems.

NNSA/NFO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office.

NNSA/NSO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office.

Navarro Geographic Information Systems. 2018. ESRI ArcGIS Software.

Tinney, J.F., B.W. Church, D.L. Wheeler, and B.R. Wilborn. 2000. *Assessment of a Methodology for Determining Removable Soil Contamination.* May. Las Vegas, NV: Science Applications International Corporation; BWC Enterprises, Inc.; and U.S. Department of Energy, Nevada Operations Office.

USC, see *United States Code.*

United States Code. 2012. Title 42 USC 2011 et seq., "Atomic Energy Act of 1954," as amended. Washington, DC: U.S. Government Printing Office.

U.S. Department of Energy. 2013. *Records Management Program*, DOE Order 243.1B, Change 1. Washington, DC: Office of the Chief Information Officer.

U.S. Department of Energy, Environmental Management Nevada. 2017a. *Corrective Action Decision Document/Corrective Action Plan for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion (TTR), Tonopah Test Range, Nevada*, Rev. 0, DOE/NV--1560. Las Vegas, NV.

U.S. Department of Energy Environmental Management Nevada Program. 2017b. *Soils Activity Quality Assurance Plan*, Rev. 1, DOE/NV--1478-REV. 1. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office. 2014. *Soils Risk-Based Corrective Action Evaluation Process*, Rev. 1, DOE/NV--1475-Rev. 1. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office. 2016a. *Corrective Action Investigation Plan for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion (TTR) Tonopah Test Range, Nevada*, Rev. 1, DOE/NV--1542. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office. 2016b. *Nevada National Security Site Waste Acceptance Criteria*, DOE/NV--325-16-00. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2004. *Corrective Action Decision Document for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion (TTR)*, DOE/NV--895-Rev. 1. Las Vegas, NV

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2012. *Nevada National Security Site Radiological Control Manual*, DOE/NV/25946--801, Rev. 2. Prepared by Radiological Control Managers' Council. Las Vegas, NV.

Appendix A

DQOs as Developed in the CADD/CAP

Note: This appendix contains the DQOs presented in the CADD/CAP and consists of Appendix F of the CADD/CAP. Therefore, cross-references, page numbers, and header information in this appendix refer to the original document.

F.1.0 Sampling and Analysis Plan

The DQO process described in this appendix is a systematic planning method used to plan data collection activities and define performance criteria for the post-remediation confirmation sampling at CAU 413, Clean Slate II Plutonium Dispersion (TTR). These DQOs are designed to ensure that the data collected will provide sufficient and reliable information to confirm implementation of clean closure at CAU 413. The seven steps of the DQO process presented in Sections F.2.0 through F.8.0 were developed in accordance with *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006).

F.2.0 Step 1 - State the Problem

Step 1 of the DQO process defines the problem that requires study and develops a conceptual model of the environmental hazard to be investigated.

F.2.1 Problem Statement

The problem statement for CAU 413 clean closure is as follows: "Verification information is required to determine whether COCs are present after implementation of corrective action at CAU 413."

F.2.2 Conceptual Site Model

The CSM is used to organize and communicate information about site characteristics. It reflects the best interpretation of available information at a point in time. The CSM is a primary vehicle for communicating assumptions about release mechanisms, potential migration pathways, or specific constraints. The CSM describes the most probable scenario for current conditions at the site and defines the assumptions that are the basis for identifying appropriate sampling strategy and data collection methods. An accurate CSM is important as it serves as the basis for all subsequent inputs and decisions throughout the DQO process.

The CSM presented in the CAU 413 CAIP (NNSA/NFO, 2016) was updated using data collected during the CAI and assuming complete implementation of the corrective action of clean closure, as defined in this CADD/CAP. The CSM presented in the CAU 413 CAIP contained the seven study group elements evaluated during the CAI. Based on the data collected during the CAI, the CSM presented in the CAIP was validated and no revisions were necessary. As the releases in SG2, SG3, SG4, SG6, and SG7 have been determined not to present a dose above the FAL, the CSM presented in this appendix is limited to the post-remediation state of the remediated areas. The post-remediation CSM assumes the physical setting of the site, contaminant sources, release information, historical background information, and physical and chemical properties of the potentially affected media are unchanged from what was presented in the CAIP DQOs. A diagram of the CSM is presented in Figure F.2-1.

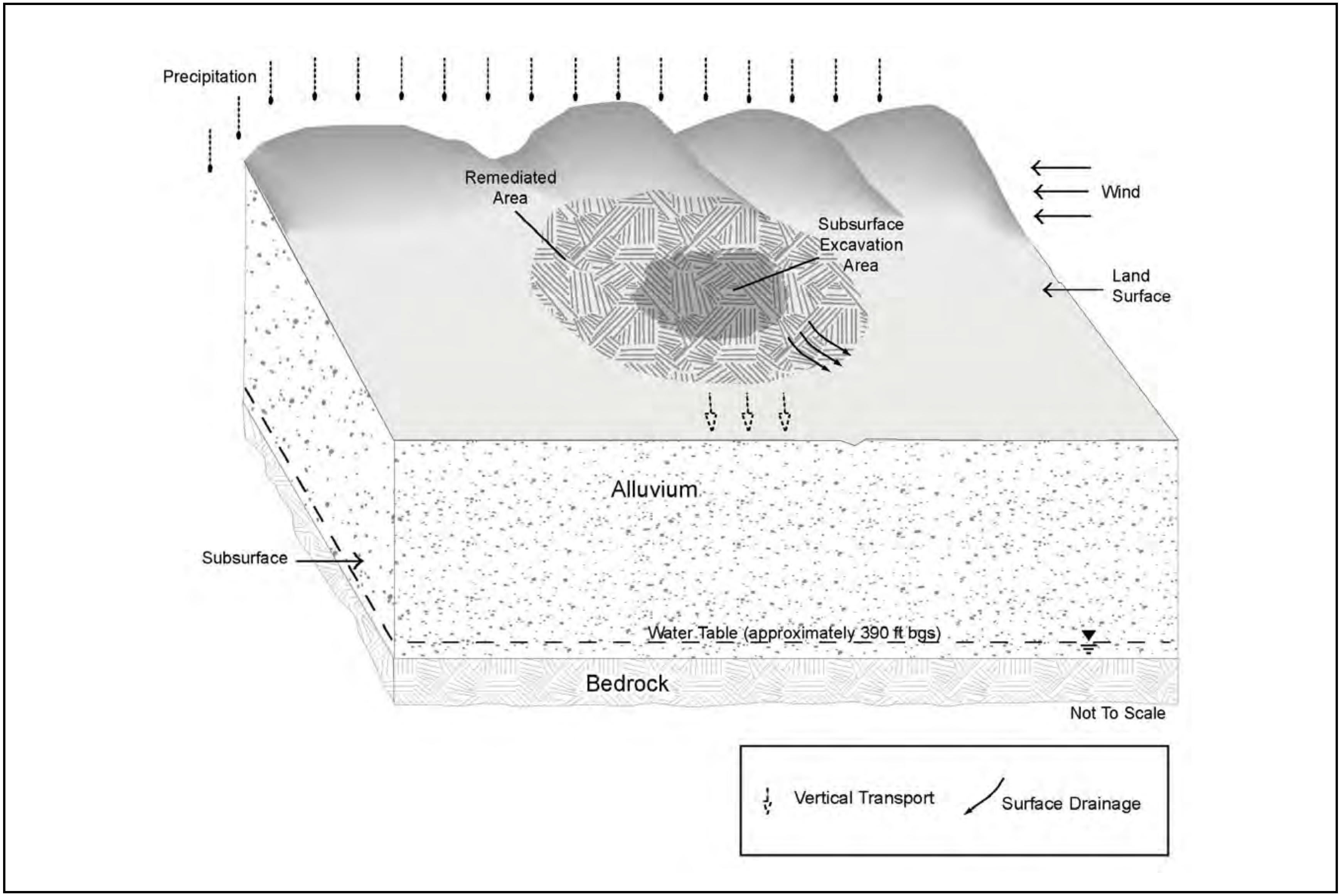

Figure F.2-1
Corrective Action CSM

F.2.2.1 Release Sources

The potential release source at CAU 413 is radionuclide contamination originally dispersed and/or buried as a result of the CSII test that is not removed during the corrective action.

F.2.2.2 Potential Contaminants

The release-specific COPCs are defined as the contaminants reasonably expected at the site that could contribute to a dose or risk exceeding FALs based on the nature of the releases identified in Section 2.2.1. Based on the evaluation of dose from 85 samples collected during the CAI, no detected radionuclide other than Am-241 and Pu-239/240 was attributed to more than 1.2 percent of TED. Therefore, the only radionuclides considered to be COPCs for the post-remediation DQOs are Am-241 and Pu-239/240.Based on the evaluation of dose from 85 samples collected during the CAI, no detected radionuclide other than Am-241 and Pu-239/240 was attributed to more than 1.2 percent of TED. Therefore, the only radionuclides considered to be COPCs for the post-remediation DQOs are Am-241 and Pu-239/240.

F.2.2.3 Contaminant Characteristics

The contaminant characteristics of the radionuclide contaminants include, but are not limited to, solubility, density, and adsorption potential. As the contaminant characteristics are unchanged from the CAIP (NNSA/NFO, 2016), refer to Section A.2.2.3 of the CAIP for information on contaminant characteristics for CAU 413.

F.2.2.4 Site Characteristics

CAU 413 is located in the Cactus Flat valley between two mountain ranges on the TTR. The topography at the site is gently sloping with surface water runoff flow to the southwest toward the Antelope Lake dry lake bed. As the site characteristics are unchanged from the CAIP (NNSA/NFO, 2016), refer to Section 2.2.4 of the CAIP for additional information.

F.2.2.5 Migration Pathways and Transport Mechanisms

As evidenced by the CAI data, the migration pathways and transport mechanisms are unchanged from that presented in the CAIP (NNSA/NFO, 2016); and vertical and lateral transport of contamination is limited, as the contaminants are relatively immobile. This provides the potential for a much greater lateral transport of contaminants compared to vertical flow.

F.2.2.6 Exposure Scenarios

The exposure scenarios are unchanged from the CAIP (NNSA/NFO, 2016). Human receptors may be exposed to COPCs through oral ingestion or inhalation of, or dermal contact (absorption) with soil or debris due to inadvertent disturbance of these materials, or external irradiation by radioactive materials. As presented in Appendix D, the most appropriate exposure scenario for CAU 413 was conservatively established as the CW exposure scenario.

F.3.0 Step 2 - Identify the Goal of the Study

Step 2 of the DQO process states how environmental data will be used in meeting objectives and solving the problem, identifies study questions or decision statements, and considers alternative outcomes or actions that can occur upon answering the questions.

F.3.1 Decision Statements

The decision statement is as follows: "Do COCs remain following completion of the corrective action removal activities?"

F.3.2 Alternative Actions to the Decision

If COCs are not present in the remaining material following completion of the corrective action removal activities, further corrective action is not required. If COCs are present, additional contaminated material will be removed.

F.4.0 Step 3 - Identify Information Inputs

Step 3 of the DQO process identifies the information needed, determines sources for information, and identifies methods that will allow reliable comparisons with corrective action criteria.

F.4.1 Information Needs

To resolve the DQO decision (determine whether COCs remain), soil samples will be collected and analyzed following these two criteria:

- Samples must be collected in areas most likely to contain a COC (judgmental sampling).
- The method must be sufficient to identify any COCs present.

The resolution of DQO Decision I for each excavated area will be based on analytical soil sample results. Therefore, the analytical data will be considered decisional data. To ensure samples are collected in the areas most likely to contain a COC (if present), sample locations will be selected from the most elevated radiological readings using relative readings from a radiological survey. This use of the FIDLER radiological survey data for selecting soil sample locations meets the definition of decision-supporting data as defined in the Soils QAP (NNSA/NSO, 2012). To additionally ensure that samples are collected in the areas most likely to contain a COC (if present), visual and geophysical surveys will be conducted to ensure that all buried debris is removed before collecting the verification samples. These surveys meet the definition of decision-supporting data as defined in the Soils QAP.

As the dose to a potential receptor cannot be estimated for removable contamination, the decision to require corrective action for removable contamination will be based on an assumption that removable contamination exceeds the radiological FAL when the HCA criterion is exceeded. The HCA criterion does not represent dose and is not a basis for determining whether COCs are present. It is an additional consideration for making the conservative assumption of the need for corrective action where it cannot be determined whether COCs are present. This use of removable contamination information meets the definition of decision-supporting data as defined in the Soils QAP.

F.4.2 Sources of Information

Information to satisfy the DQO decision will be generated by collecting and analyzing soil samples from the area of highest radiological readings in and adjacent to the remediated area. Information to support the DQO decision for all excavated areas will be generated by performing a radiological survey of the remediated areas and of the adjacent undisturbed soil. Additional information to support the DQO decision for SG5 will be generated by performing visual and geophysical surveys.

F.5.0 Step 4 - Define the Boundaries of the Study

Step 4 of the DQO process defines the target population of interest and its relevant spatial boundaries, specifies temporal and other practical constraints associated with survey/data collection, and defines the sampling units on which decisions or estimates will be made.

F.5.1 Target Populations of Interest

The population of interest to resolve the DQO decision (determine whether COCs remain in or adjacent to remediated area) is the presence of PSM or a dose above FALs.

F.5.2 Spatial Boundaries

Spatial boundaries are the maximum lateral and vertical extent of expected contamination that can be supported by the CSM. The spatial boundaries are as follows:

- **Vertical.** 2 m below original ground surface for the buried debris, and 10 cm for surface contaminated soil.
- **Lateral.** 10 m beyond the corrective action boundary defined in Appendix A.

COCs found beyond these boundaries may indicate a flaw in the CSM and in earlier analytical results, and may require reevaluation of the CSM before the investigation can continue.

F.5.3 Practical Constraints

Practical constraints may be activities by other organizations, utilities, threatened or endangered animals and plants, unstable terrain, and/or access restrictions that may affect the ability to investigate this site. The only practical constraints that have been identified specific to CAU 413 are the potential impacts from other organizations, and site access restrictions.

F.5.4 Define the Sampling Units

The scale of decision making refers to the smallest, most appropriate area or volume for which decisions will be made. The scale of decision making was defined as each of the corrective action excavations.

F.6.0 Step 5 - Develop the Analytic Approach

Step 5 of the DQO process specifies appropriate population parameters for making decisions, defines action levels, and generates a decision rule.

F.6.1 Population Parameters

Population parameters are the parameters compared to action levels. The population parameters are defined for judgmental and probabilistic sampling designs in the CAIP (NNSA/NFO, 2016).

F.6.2 Action Levels

The FALs are established in Appendix D.

F.6.3 Decision Rules

The decision rules applicable to the DQO decision are as follows:

- If contamination levels are inconsistent with the CSM or extend beyond the spatial boundaries identified in Section F.5.2, then work will be suspended and the corrective action strategy will be reconsidered, else the decision will be to continue the corrective action.
- If the TED in the population of interest (defined in Step 4) exceeds the radiological FAL, then additional corrective action will be implemented, else no further corrective action is needed.

F.7.0 Step 6 - Specify Performance or Acceptance Criteria

Step 6 of the DQO process defines the decision hypotheses, specifies controls against false rejection and false acceptance decision errors, examines consequences of making incorrect decisions from the test, and places acceptable limits on the likelihood of making decision errors. The performance and acceptance criteria presented in this section will be evaluated in the DQA section of the CR.

F.7.1 Decision Hypotheses

The baseline condition (i.e., null hypothesis) and alternative condition for the DQO decision are as follows:

- **Baseline condition.** A COC is present.
- **Alternative condition.** A COC is not present.

Decisions and/or criteria have false-negative or false-positive errors associated with their determination. The impact of these decision errors and the methods that will be used to control these errors are discussed in the following subsections. In general terms, confidence in the DQO decision will be established qualitatively by the following:

- Developing a CSM (based on process knowledge).
- Testing the validity of the CSM based on corrective action results.
- Evaluating the quality of data.

F.7.2 False-Negative Decision Error

The false-negative decision error would mean deciding that a COC is not present when it actually is. The potential consequence is an increased risk to human health and environment. Refer to Section A.7.2 of the CAIP (NNSA/NFO, 2016) for additional detail on false-negative decision errors.

F.7.3 False-Positive Decision Error

The false-positive decision error would mean deciding that a COC is present when it is not, resulting in increased costs for unnecessary corrective action activities. Refer to Section A.7.3 of the CAIP (NNSA/NFO, 2016) for additional detail on false-positive decision errors.

F.8.0 Step 7 - Develop the Plan for Obtaining Data

Step 7 of the DQO process selects and documents a design that will produce data that exceeds performance or acceptance criteria. A judgmental scheme will be implemented to select survey and sample locations within the remediated areas at CAU 413. A probabilistic sampling scheme will be implemented to select sample locations within the sample plot and evaluate the analytical results.

A radiological survey of the remediated areas and of the adjacent undisturbed soil (minimum of 2 m from the excavation boundary) will be performed to identify the location of the highest remaining radioactivity. Surveys will be conducted using vehicle-mounted and/or hand-held FIDLER instruments connected to a GPS instrument. The results of the FIDLER survey will be used to bias soil sample locations to locations within each remediation area with the most elevated readings. For SG1, a minimum of one soil sample plot will be established at the location of the highest radiological survey value in each of the four areas identified by the 25-mrem/CW-yr boundary shown in Figure A.3-4. For SG5, the excavation area will be visually assessed to ensure that all visible debris has been removed, geophysical surveys will be completed to verify that all debris has been removed from the subsurface excavation area, and a minimum of one soil sample plot will be established at the location of the highest radiological survey value. The remaining dose at these sample plots will be calculated using the analytical results from the soil samples (TLDs will not be used to estimate external dose).

For removable contamination, removable contamination surveys will be conducted at the confirmation sample locations where HCA conditions were identified in the CAI to verify that HCA conditions no longer exist.

All samples collected for corrective action confirmation will be analyzed for gamma spectroscopy. The activity of the Pu isotopes will be inferred using the ratios established from the CAI sample results.

F.9.0 References

EPA, see U.S. Environmental Protection Agency.

NNSA/NFO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office.

NNSA/NSO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office.

U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office. 2016. *Corrective Action Investigation Plan for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion (TTR), Tonopah Test Range, Nevada*, Rev. 1, DOE/NV--1542. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2012. *Soils Activity Quality Assurance Plan*, Rev. 0, DOE/NV--1478. Las Vegas, NV.

U.S. Environmental Protection Agency. 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process*, EPA QA/G-4, EPA/240/B-06/001. Washington, DC: Office of Environmental Information.

Appendix B

Closure Certification

B.1.0 Closure Certification

Certification of closure is required for permitted or interim status hazardous waste facilities, and is not applicable to CAU 413.

Appendix C

As-Built Documentation

C.1.0 As-Built Documentation

The corrective actions selected for CAU 413 did not include any engineered controls. Therefore, as-built documentation is not applicable to CAU 413.

Appendix D

Confirmation Sampling Test Results

D.1.0 Introduction

This appendix presents a discussion of the closure verification activities and calculated dose for the verification soil samples collected at CAU 413. These activities were conducted and samples were collected to demonstrate that radiological contamination remaining at the site is less than the FAL using the CW exposure scenario.

The CAA of clean closure was implemented as stipulated in the CAU 413 CADD/CAP (DOE/EMNV, 2017a). The corrective action of clean closure consists of the removal of soil and debris defined in the CADD/CAP as requiring further corrective action. For convenience in conducting the corrective actions at CAU 413, the areas requiring corrective action were identified as Zones 0 through 3 in SG1 (Undisturbed Areas) and Zones 4 through 6 in SG5 (Buried Debris).

SG2, Disturbed Areas; SG3, Sedimentation Areas; SG4, Former Staging Area; SG6, Potential Source Material; and SG7, Soil Mounds did not require corrective action and will not be addressed in this document.

This appendix contains information and data in sufficient detail to justify that no further corrective action is required at CAU 413. This information was used to resolve DQO decisions that are discussed in detail in the DQA presented in Section 4.1. The complete field documentation and laboratory data—including field activity daily logs, sample collection logs (SCLs), analysis request/chain-of-custody forms, laboratory certificates of analyses, and analytical results—are retained in CAU 413 files as hard copy documents or electronic media.

D.2.0 Closure Verification Activities

The objective of the closure activities conducted at CAU 413 was to implement corrective actions and collect verification samples as necessary to support the closure of CAU 413. Closure verification activities for CAU 413 were conducted between October 2017 and July 2018. Activities included geophysical surveys, visual surveys, ground-based radiation surveys, surface soil sampling, and removable contamination surveys. The investigation and sampling program adhered to the requirements set forth in the CADD/CAP (DOE/EMNV, 2017a) and in accordance with the Soils QAP (DOE/EMNV, 2017b), which establishes requirements, technical planning, and general quality practices. The evaluation of investigation results and the risk associated with site contamination were conducted in accordance with the Soils RBCA document (NNSA/NFO, 2014). The following subsections describe the specific investigation activities that took place at CAU 413.

D.2.1 Radiological Surveys

FIDLER surveys were conducted within excavated zones 0, 1a, 1b, 2, 3, 4, and 6 following soil/debris removal. Per the CADD/CAP (DOE/EMNV, 2017a), these surveys were conducted as part of sampling verification to determine the locations of the highest remaining radioactivity within each excavated zone, in order to bias soil plot sample locations within the excavated areas. FIDLER surveys were performed in conjunction with a Global Positioning System (GPS) receiver and datalogger. FIDLER surveys were conducted within six zones, out to a minimum distance of 2 m beyond each excavated boundary. (See Figure D.2-2 for results of the final FIDLER surveys.) Results of the pre-corrective action FIDLER surveys are presented in Figure D.2-1 for comparison. Figure D.2-1 also shows the initial CABs as presented in the CADD/CAP. The final CABs following completion of the corrective actions are shown in Figure D.2-2.

D.2.2 Soil Sampling

Soil sampling within both SG1 and SG5 at CAU 413 was conducted at judgmental locations, determined from the highest results of the FIDLER surveys at each excavated zone. Soil sampling consisted of the collection of surface soil samples within sample plots. Within each sample plot, at least one composite sample was collected, composed of nine aliquots using an unbiased random-start, triangular grid pattern.

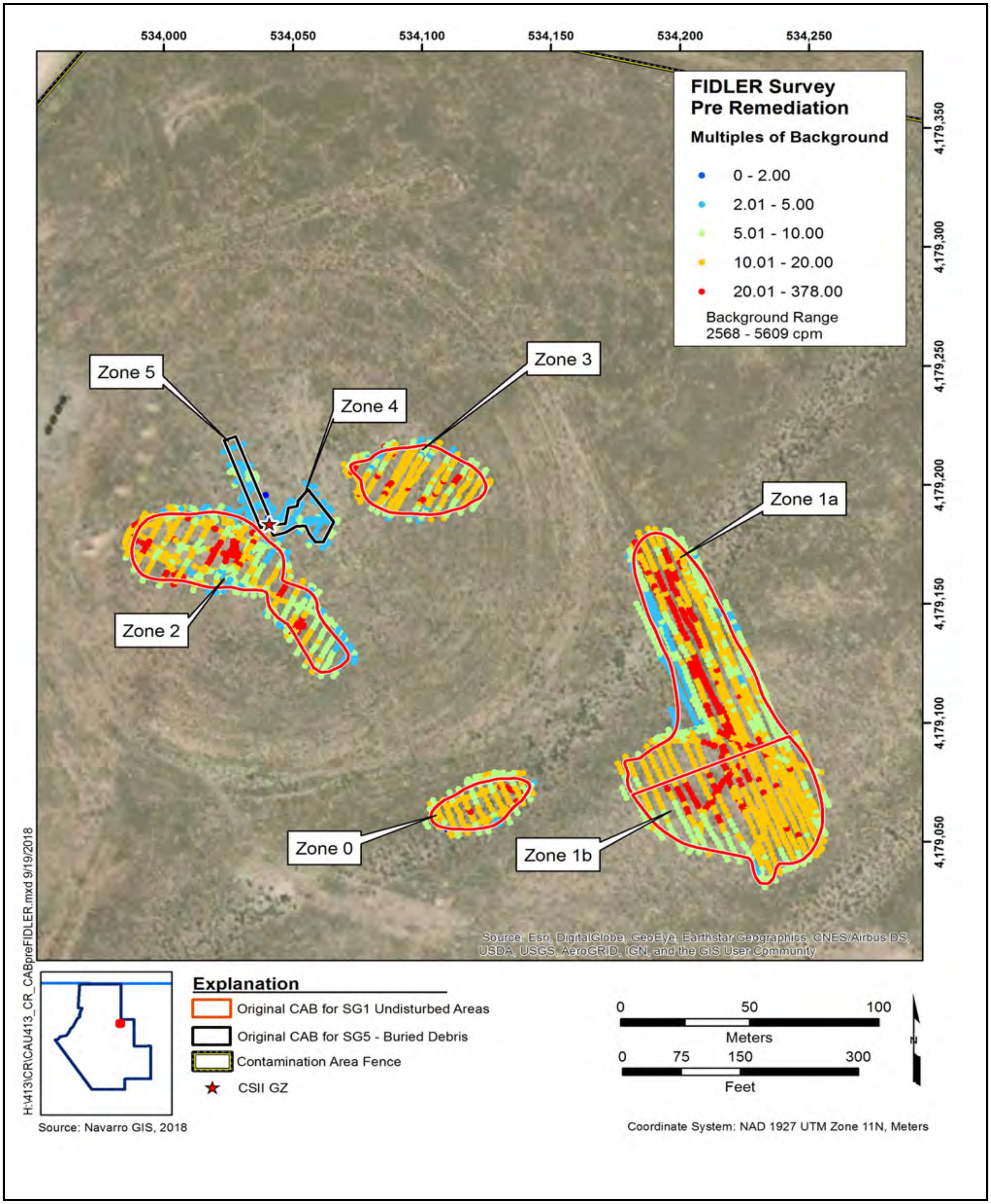

Figure D.2-1
CAU 413 Pre-Corrective Action FIDLER Survey Results

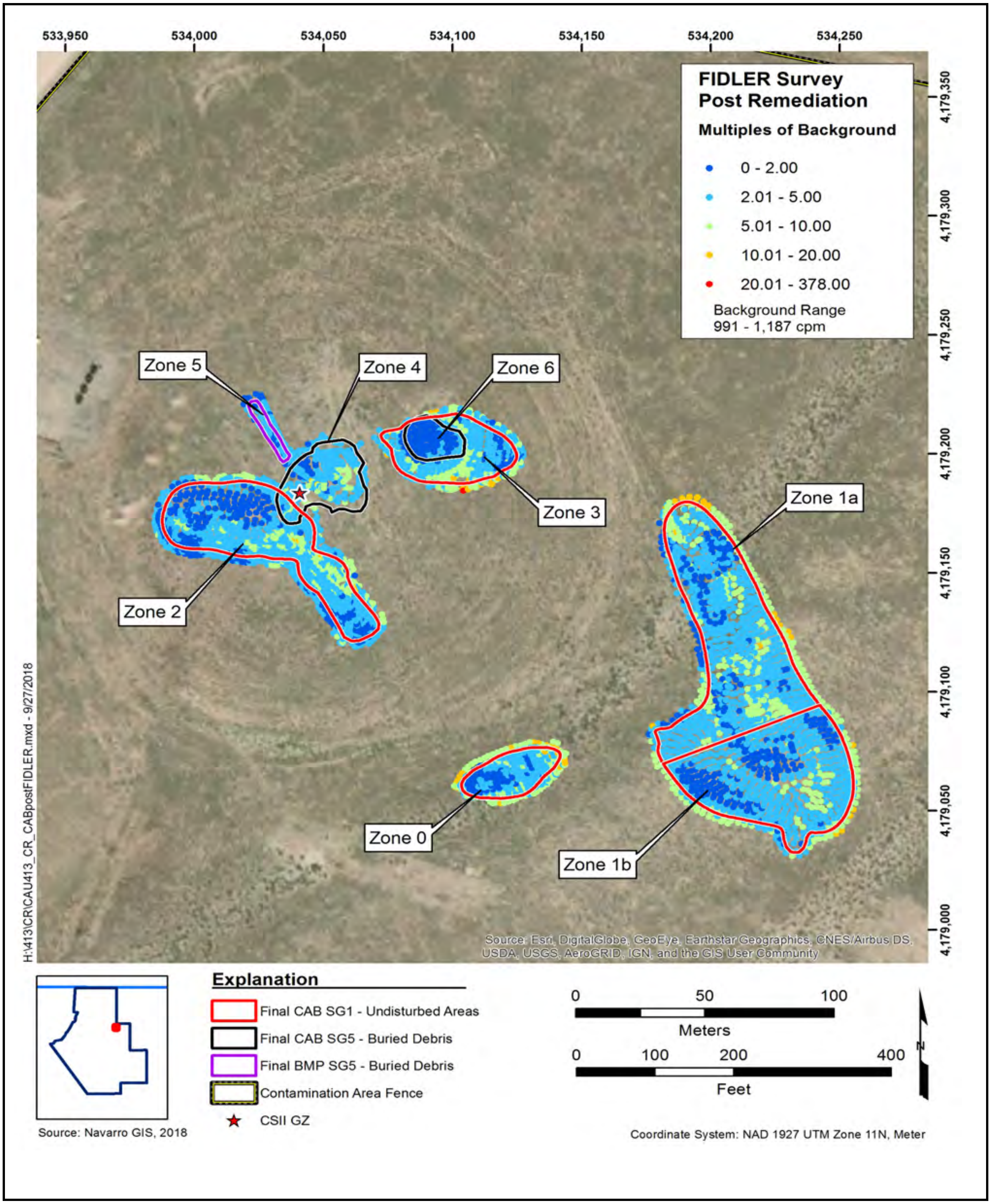

Figure D.2-2
CAU 413 Post-Corrective Action FIDLER Survey Results and Final CABs

All sample locations were surveyed with a GPS instrument. Table H.1-1 presents these GPS data in a tabular format. Additional information on the selection of sample locations is found in the study-group-specific sections (see Sections D.3.0 and D.4.0). Sampling locations were accessible, and sampling activities at planned locations were not restricted.

D.2.3 Removable Contamination Surveys

Per the CADD/CAP (DOE/EMNV, 2017a), removable contamination surveys were conducted to verify that HCA conditions no longer exist. These surveys were conducted within the boundaries of each verification soil sample plot (see Figures D.3-2 and D.3-3). The survey method uses a tool to obtain a swipe sample of removable radioactive contamination from the ground surface. The sample is then analyzed by calibrated radiation instruments that undergo daily quality checks.

D.2.4 Dose Calculations

Soil data are used to estimate a maximum potential TED that could be received by a human receptor within each release zone. The following subsections discuss the process for estimating dose from the soil data.

Dose was calculated using the radionuclide analytical results from soil samples and the corresponding RRMG (NNSA/NFO, 2014). The RRMG concentration for a particular radionuclide is that concentration in surface soil that would cause a dose to a receptor of 25 mrem/yr (under the CW exposure scenario) independent of any other radionuclide (assuming that no other radionuclides contribute dose). The RRMG for each detected radionuclide (in picocuries per gram [pCi/g] of soil) was derived using RESRAD computer code (Yu et al., 2001) under the CW exposure scenario (NNSA/NFO, 2014).

The total dose corresponding to each surface soil sample was calculated by adding the dose contribution from each radionuclide. For each sample, the radionuclide-specific analytical result was divided by its corresponding RRMG (NNSA/NFO, 2014) to yield a fraction of the 25-mrem/yr dose and then multiplied by 25 to yield a dose estimate (in mrem/yr) at that sample location. Soil concentrations of plutonium isotopes are inferred from gamma spectroscopy results as described in the representativeness discussion of Section 4.1.1.1.1. The doses for all radionuclides detected in a soil sample were then summed to yield a dose for that sample. For judgmental sample locations where only one sample was collected, statistical inferences could not be calculated, and the single analytical result was used to calculate the dose.

The calculation of TED using the methodologies described in the Soils RBCA document (NNSA/NFO, 2014) is not intended to represent the actual dose a receptor might receive from the release site. Due to the many conservative assumptions and the use of conservative input parameter values used in RESRAD for the calculation of RRMGs, the resulting calculated TED values are intentionally inflated. This overestimation of dose provides protection from making false-negative decision errors and compensates for uncertainties.

D.2.5 Comparison to Action Levels

The radiological FAL is based on an annual dose limit of 25 mrem/yr. This dose limit is specific to the annual dose a receptor could potentially receive from a CAU 413 release. As such, it is dependent upon the cumulative annual hours of exposure to site contamination. The FAL was established in Appendix D of the CADD/CAP (DOE/EMNV, 2017a) based on the CW exposure scenario with an annual exposure time of 960 hours in which a site worker is exposed to site contamination for 8 hr/day and 120 day/yr. Results are presented in Sections D.3.1.2 and D.4.1.4. Radiological results are reported as doses that are comparable to the dose-based FAL as established in the CADD/CAP.

D.3.0 SG1, Undisturbed Areas

SG1, Undisturbed Areas, consists of those areas that were defined as not impacted by post-test operations in the vicinity of the CSII test, exclusive of the areas defined by other study groups. Four CABs (defined as Zones 0, 1, 2, and 3) for the CAA of clean closure were established in the CADD/CAP (DOE/EMNV, 2017a) for SG1. Zone 1 was split into two areas (Zone 1a and 1b) for nuclear safety reasons, resulting in five remediation zones.

D.3.1 Closure Activities

The specific closure activities conducted at SG1 (Undisturbed Areas) are described in the following subsections.

D.3.1.1 Radiological Surveys

Per the CADD/CAP (DOE/EMNV, 2017a), FIDLER surveys were conducted following soil/debris removal at SG1. The FIDLER surveys were conducted within each of the five excavated zones (0, 1a, 1b, 2, and 3) extending out to a minimum of 2 m beyond each excavated boundary. Within each excavated zone, the location of highest remaining radioactivity as detected from the FIDLER survey was used to bias sample plot locations. The results of the final FIDLER surveys at SG1 are shown in Figure D.3-1.

D.3.1.2 Soil Samples

Based on the results of the FIDLER surveys conducted at SG1, one sample plot was placed at the location of highest remaining radioactivity in each of the five excavated zones (Zone 0, 1a, 1b, 2, and 3) (Figures D.3-2 and D.3-3). These sample plots were placed in order to verify that contamination exceeding FALs is not present at any location within the excavated zones at SG1. All soil samples were collected at a depth of 5 cm and submitted for gamma spectroscopy analyses. Sample numbers associated with the sample plots are shown in Table D.3-1. Sample locations are shown in Figures D.3-2 and D.3-3.

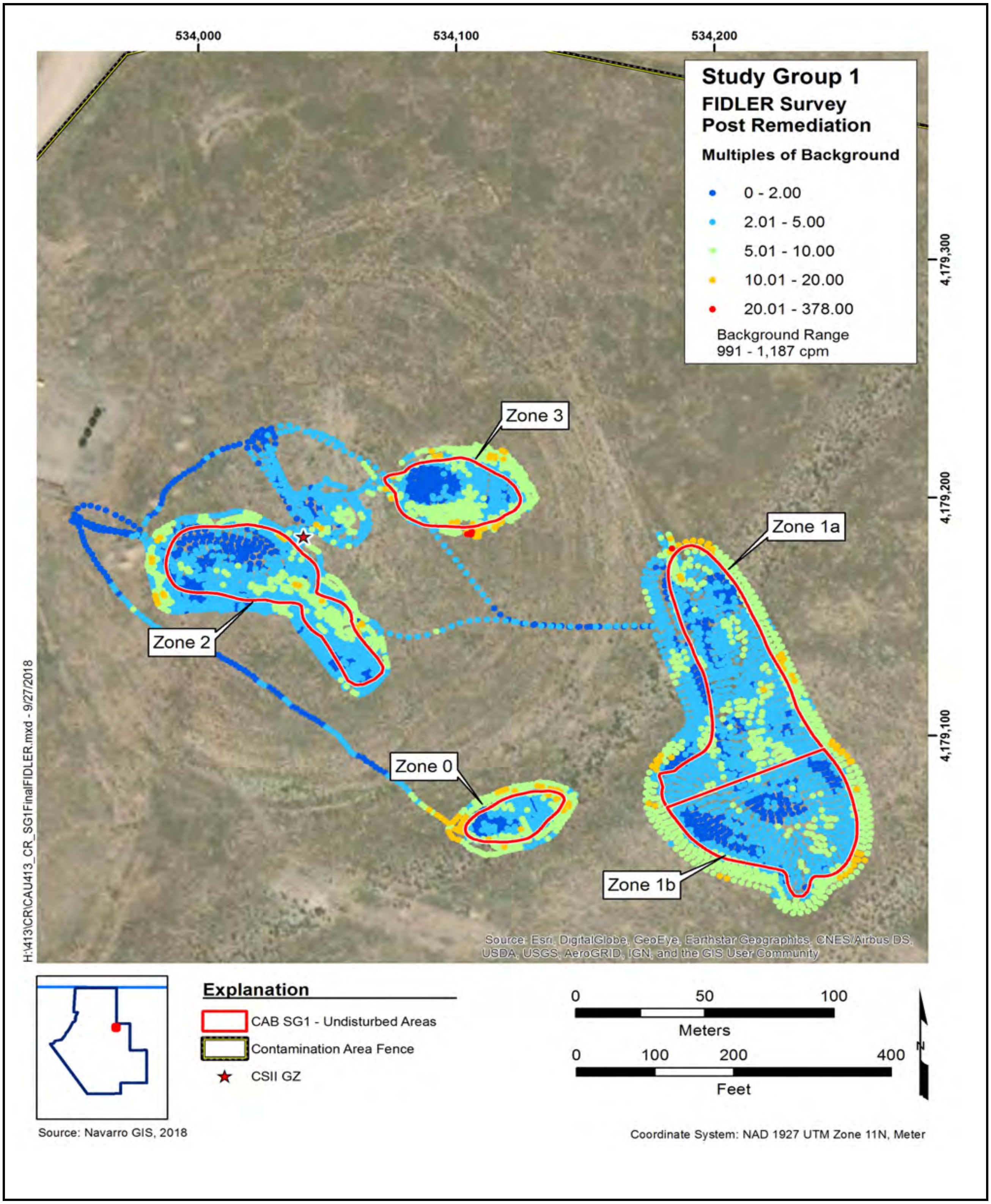

Figure D.3-1
Final FIDLER Survey Results at SG1

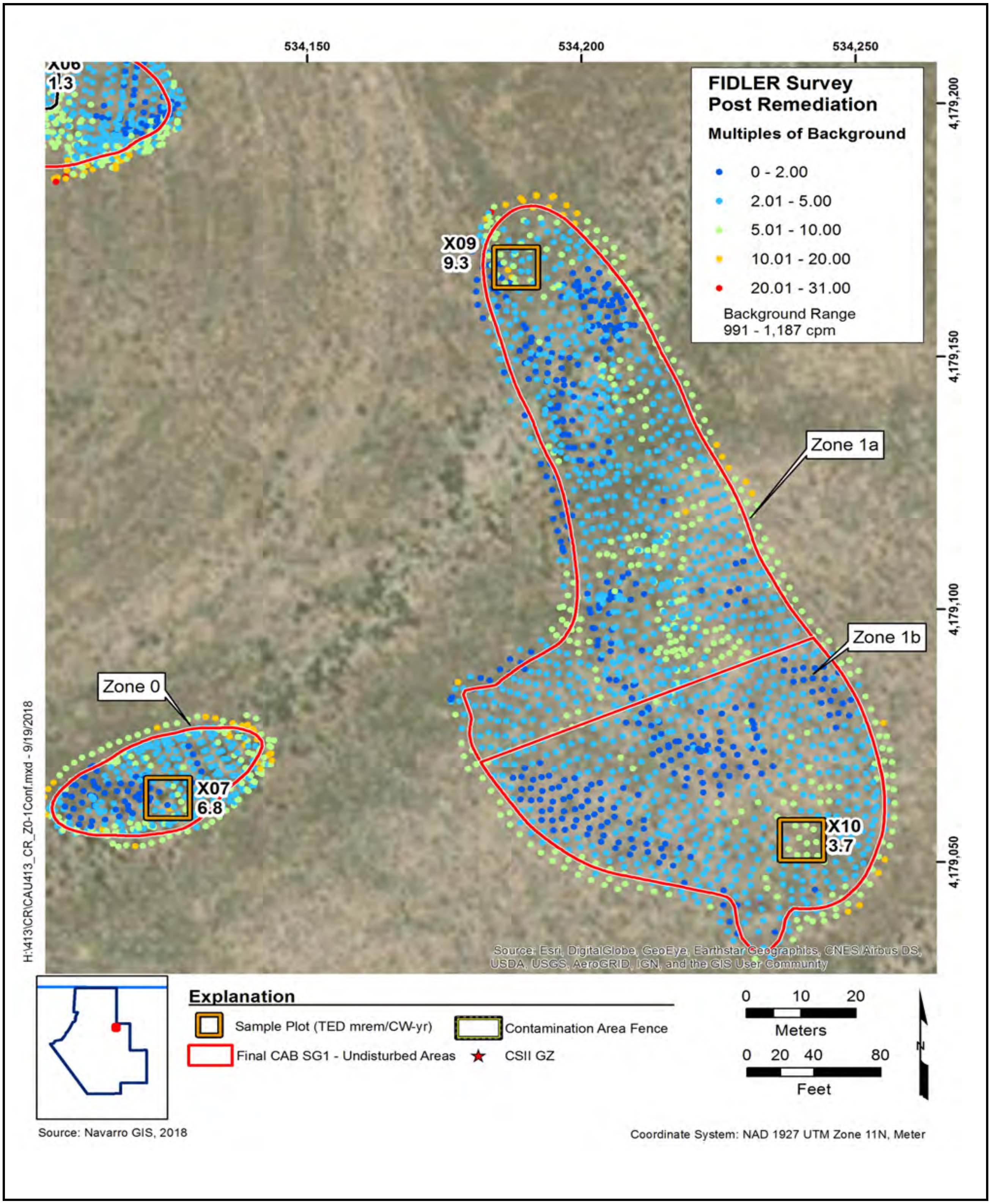

Figure D.3-2
FIDLER Survey Results, Soil Sample Locations, and TED at SG1

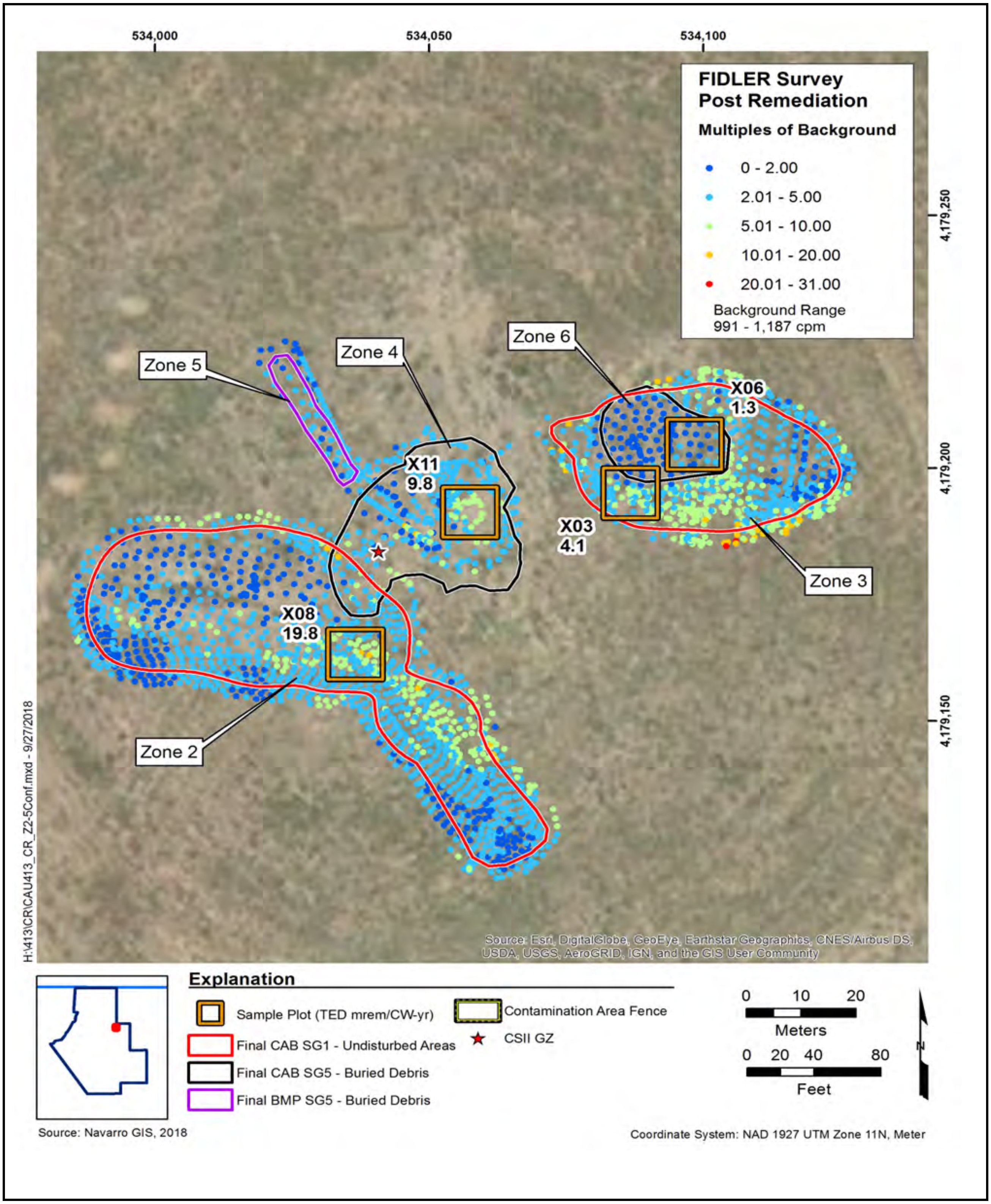

Figure D.3-3
FIDLER Survey Results, Soil Sample Locations, and TED at SG1 and SG5

Table D.3-1
TED for Sampled Locations at SG1

Zone	Sample Location	Sample Number	CW TED (mrem/yr)
0	X07	AB3A083, AB3A083a, AB3A084	6.8
1a	X09	AB3A086	9.3
1b	X10	AB3A087	3.7
2	X08	AB3A085	19.8
3	X03	AB3A074, AB3A075	4.1

Doses for plots in excavated zones 0, 1a, 1b, 2, and 3 were calculated using the methods described in Section D.2.4. See Table D.3-1 and Figure D.3-1 for the TED data for sample locations within SG1. The TED did not exceed the FAL at any sampled location in SG1.

The analytical results for radionuclides are presented in Appendix G.

D.3.1.3 Removable Contamination Surveys

Removable contamination surveys were conducted within the boundaries of each sample plot at SG1. These surveys were conducted to verify that HCA conditions no longer exist within the CABs at SG1. Results of the surveys as presented in Table D.3-2 show that removable contamination does not meet HCA conditions (greater than 2,000 disintegrations per 100 square centimeters [dpm/100 cm^2] alpha).

D.3.2 Nature and Extent of COCs

Based on the data evaluation and the land use scenario, the TED does not exceed the FAL of 25 mrem/CW-yr at any sampled location within SG1. Therefore, COCs no longer exist at SG1.

Table D.3-2
Removable Contamination Survey Results for Sample Plots at SG1

Zone	Sample Location	Removable Contamination (dpm/100 cm^2 alpha)
0	X07	964
		321
		214
		317
		107
1a	X09	462
		107
		393
		71
		143
1b	X10	179
		393
		149
		286
		250
2	X08	321
		357
		857
		214
		107
3	X03	362
		352
		267
		352
		362

D.4.0 SG5, Buried Debris

SG5, Buried Debris, consists of contaminated debris and soil that was buried at GZ after the CSII test. Two CABs for the CAA of clean closure (identified herein as Zones 4 and 5) were established in the CADD/CAP (DOE/EMNV, 2017a) for SG5. An additional area of buried debris was identified during closure activities and is included within SG5 as Zone 6 (Figure 1-2).

While implementing corrective actions at SG5, it was determined that the linear subsurface anomaly identified by the geophysical survey in the CADD/CAP and identified as Zone 5 consisted of a metal conduit pipe containing electrical cable (Figure 2-4). This pipe is not within the CSM of SG5, as this study group was defined in the CAIP (NNSA/NFO, 2016) as the release of contaminants to subsurface soil from contaminated soil and debris that was collected and buried at GZ after the CSII test in 1963 and covered with "several feet of clean earth" (AEC/NVOO, 1964). Although the specific purpose of the electrical conduit pipe is unknown, based on process knowledge and field-screening results, there is no reason to suspect that it is contaminated or requires corrective action. However, as a BMP, the pipe was removed and disposed of at the Area 5 RWMC (Figure 2-4).

During excavation of buried debris within Zone 4, the buried debris extended beyond the initial CABs. Corrective actions for Zone 4 were expanded to include the additional area. See Figure 1-2 for the final CAB of Zone 4.

D.4.1 Closure Activities

The specific closure activities conducted at SG5 (Buried Debris) are described in the following subsections.

D.4.1.1 Visual Surveys

A visual survey that encompassed the excavated areas of Zones 4 and 6 was conducted to verify that all buried debris was removed. No remaining debris was identified as a result of the visual survey. Figures D.4-1 and D.4-2 show examples of the type of debris removed from Zone 4. The photos in these figures show two sides of the same debris items. These large pieces of debris are consistent with the CSM, as they were identified as portions of the original bunker that were buried near the GZ.

04/10/2018 (PIRDY-57-219450)

Figure D.4-1
SG5, Debris Removed from Zone 4 Facing Northwest

05/03/2018 (PIRDY-57-220559)

Figure D.4-2
SG5, Additional Debris Removed from Zone 4 Facing South

Additional information about these items and the removal and disposal process is presented in Appendix I. See Figure 2-7 for a post-excavation view of Zone 6.

D.4.1.2 Geophysical Surveys

As discussed in the CADD/CAP (DOE/EMNV, 2017a), geophysical surveys were conducted at SG5 to guide the excavation of buried debris and to verify that all areas of buried debris have been removed. Geophysical instruments were used at Zone 4 to guide the excavation and to help identify additional buried debris extending beyond the original CAB. See Figure D.4-3 for the final CAB at Zone 4. In addition to the two areas identified in the CADD/CAP as buried debris areas (Zones 4 and 5), another area of buried debris was identified during surface soil removal operations within SG1 and was included in SG5 as Zone 6 (Section 2.1.2). This buried debris was included in the corrective action and was removed.

Additional geophysical surveys were conducted over all excavated areas to verify that no areas of buried material remained. Additional geophysical surveys were also conducted beyond the excavated areas to assure that no additional areas of buried debris exist at CAU 413. These surveys were conducted using an EM61-MK2A and were completed between February and July 2018. The expanded coverage of geophysical surveys is shown in Figure D.4-3.

Figure D.4-4 shows the post-excavation results obtained using a Geonics EM61-MK2A high-sensitivity, high-resolution, time domain metal detector. The data collected do not indicate the presence of any further disposal areas. The anomalies seen in Zone 5 are due to a length of metal conduit that was left in place. The remaining anomalies of interest, numbered 1 through 6 in Figure D.4-4, represent scattered pieces of metallic debris either on the surface or just below the surface.

Table D.4-1 lists the anomalies shown in Figure D.4-4. The table gives the location, Channel 1 instrument response, and depth estimated for each anomaly. The depths were estimated using the Geonics DAT61MK2 software. As seen in Table D.4-1, the deepest estimated depth of burial was 0.27 m. The anomalies indicate the presence of scattered pieces of metallic debris and do not indicate the presence of any additional disposal areas. Although the metal conduit pipe and the uncontaminated debris items did not require corrective action, they were removed and disposed of as

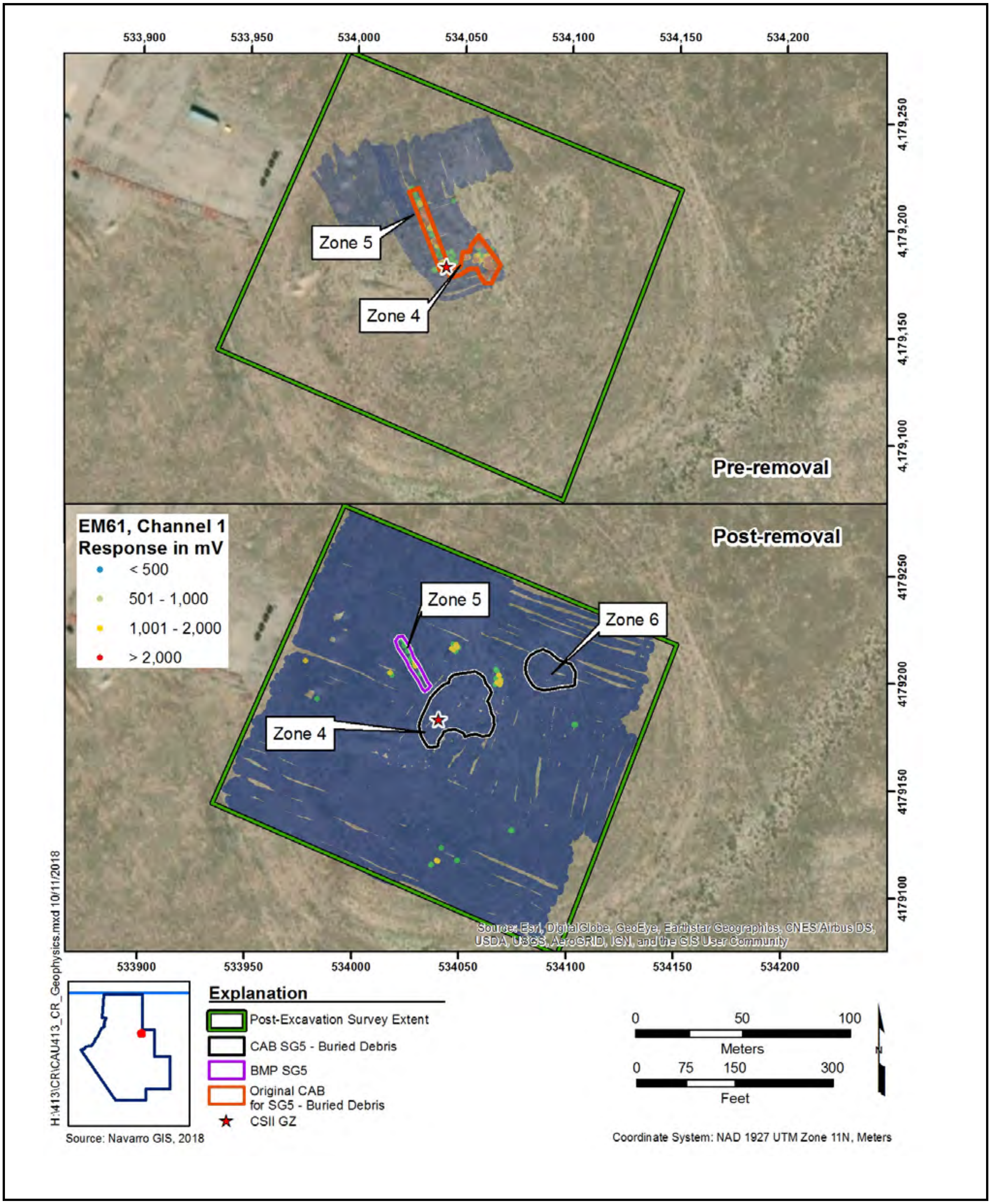

Figure D.4-3
SG5, Geophysical Survey Pre- and Post-Debris Removal

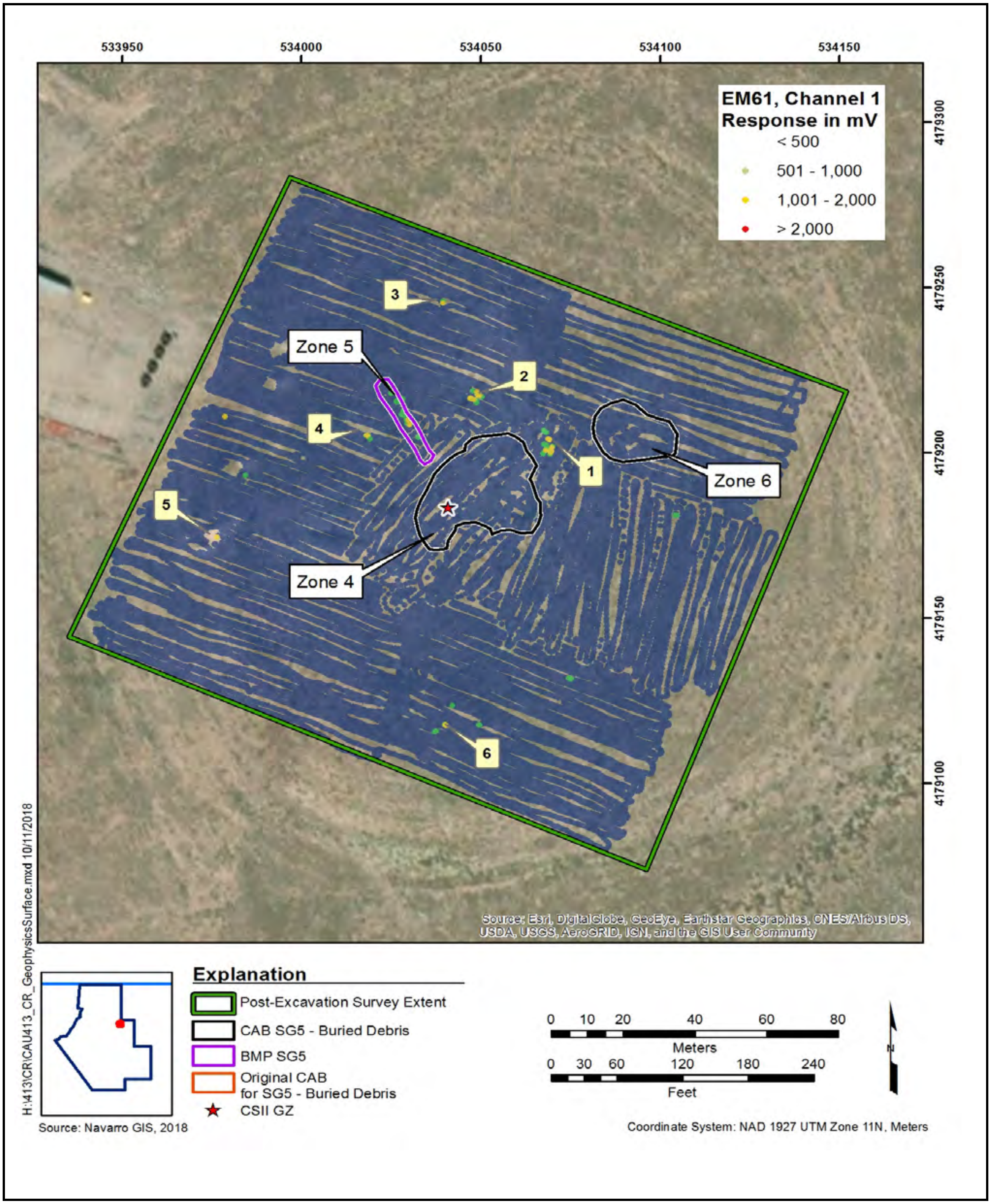

Figure D.4-4
SG5, Post-Debris Removal Geophysical Survey Results

Table D.4-1
Summary of Anomalies

Anomaly Number	Channel 1 Instrument Reading (mV)	Estimated Depth of Anomaly (m)
1	1,976.55	Surface
2	1,893.39	0.21
3	6,776.17	Surface
4	1,374.86	0.27
5	5,857.36	Surface
6	1,575.38	Surface

mV = Millivolt

LLW at the Area 5 RWMC as a BMP. Therefore, the anomalies associated with the conduit pipe and the uncontaminated debris items shown in Figure D.4-4 are no longer present at the site.

D.4.1.3 Radiological Surveys

Per the CADD/CAP (DOE/EMNV, 2017a), FIDLER surveys were conducted following soil/debris removal at SG5. The FIDLER surveys were conducted within Zone 4 and 6, extending out to a minimum 2 m beyond each excavated boundary. The locations of the highest remaining radioactivity as detected from the FIDLER survey were used to select sample plot locations within each excavated zone. The results of the final FIDLER surveys and sample plot locations at SG5 are shown in Figure D.3-3.

D.4.1.4 Soil Samples

Per the CADD/CAP (DOE/EMNV, 2017a), samples were collected from sample plots following soil/debris removal at each excavated area. One sample plot was placed at the location of the highest remaining radioactivity following completion of corrective actions within Zones 4 and 6 (Figure D.3-3). These sample plots were placed in order to verify that contamination exceeding FALs is not present at any location within the excavated zones at SG5. All soil samples were collected at a depth of 5 cm and submitted for gamma spectroscopy analyses. Sample numbers associated with the sample plots are shown in Table D.4-2. Sample locations are shown in Figure D.3-3.

Table D.4-2
TED for Sampled Locations at SG5

Zone	Sample Location	Sample Number	CW TED (mrem/yr)
4	X11	AB3A088	9.8
6	X06	AB3A080, AB3A081, AB3A082	1.3

Doses for plots in excavated Zones 4 and 6 were calculated using the methods described in Section D.2.4. See Table D.4-2 and Figure D.3-3 for the TED data for sample locations within SG5. The TED did not exceed the FAL at any sampled location in SG5.

The analytical results for radionuclides are presented in Appendix G.

D.4.1.5 Removable Contamination Surveys

Removable contamination surveys were conducted within the boundaries of each sample plot at Zones 4 and 6 to verify that HCA conditions do not exist at SG5. Results of the surveys as presented in Table D.4-3 show that removable contamination does not meet HCA conditions (greater than 2,000 dpm/100 cm^2 alpha).

Table D.4-3
Removable Contamination Survey Results for Sample Plots at SG5

Zone	Sample Location	Removable Contamination (dpm/100 cm^2 alpha)
4	X11	537
		214
		1,429
		1,036
		571
6	X06	560
		806
		175
		730
		449

D.4.2 Nature and Extent of COCs

Based on the data evaluation and the land use scenario, the TED does not exceed the FAL of 25 mrem/CW-yr at any sampled location within SG5. Therefore, it was confirmed that COCs are not present at SG5.

D.5.0 Quality Assurance

This section contains a summary of QA/QC measures implemented during the sampling and analysis activities conducted in support of the CAU 413 closure activities. The following subsections discuss the data validation process, QC samples, and nonconformances. An evaluation of the DQIs is presented in Section 4.1.

Laboratory analyses were conducted for samples used in the decision-making process to provide a quantitative measurement of any COPCs present. Rigorous QA/QC was implemented for all laboratory sample data, including documentation, verification and validation of analytical results, and affirmation of DQI requirements related to laboratory analysis. Detailed information regarding the QA program is contained in the Soils Activity QAP (DOE/EMNV, 2017b).

D.5.1 Data Validation

Data were validated in accordance with the Soils QAP (DOE/EMNV, 2017b) and approved protocols and procedures. All laboratory data from samples collected and analyzed for CAU 413 were evaluated for data quality in a tiered process. Data were reviewed to ensure that samples were appropriately processed and analyzed, and the results were evaluated using validation criteria. Documentation of the data qualifications resulting from these reviews is retained in CAU 413 files as a hard copy and electronic media.

All laboratory data were subjected to Tier I and Tier II evaluations. Laboratory data packages were reviewed for completeness. The analytical data contained within the packages were evaluated for correctness, compliance, precision, and accuracy. Where issues were encountered within the data, validation qualifiers were assigned with descriptions of why the qualifiers were added.

A Tier III evaluation was performed on the analytical results for two samples collected during closure verification activities. This review was performed by Analytical Quality Associates, Inc., of Albuquerque, New Mexico. The Tier III data validation review was in general agreement with the Tier II data validation, and no corrections to the Tier II validation were necessary.

D.5.2 QC Samples

Laboratory QC samples used to measure accuracy and precision were analyzed by the laboratory with each batch of samples submitted for analysis. When QC criteria were exceeded, qualifying flags were added to sample results, along with the reason for estimation or rejection. Documentation of data qualifications is retained in the Analytical Services Database and in the data packages located in Navarro Central Files.

D.5.3 Field Nonconformances

There were no field nonconformances identified during the closure activities.

D.5.4 Laboratory Nonconformances

Laboratory nonconformances are generally due to inconsistencies in the analytical instrumentation operation, sample preparations, extractions, missed holding times, and fluctuations in internal standard and calibration results. There were no laboratory nonconformances.

D.6.0 Summary

The corrective action of clean closure was implemented at CAU 413 consisting of the removal of soil and debris containing or assumed to contain COCs. Verification sample results from samples collected within each excavated area at CAU 413 demonstrated that no further corrective action is necessary.

D.7.0 References

AEC/NVOO, see Atomic Energy Commission, Nevada Operations Office.

Atomic Energy Commission, Nevada Operations Office. 1964. *Project Manager's Report, Project Roller Coaster*, NVO-10. Prepared by Reynolds Electrical & Engineering Co., Inc. Las Vegas, NV.

DOE/EMNV, see U.S. Department of Energy, Environmental Management Nevada.

Navarro GIS, see Navarro Geographic Information Systems.

NNSA/NFO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office.

NNSA/NSO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office.

Navarro Geographic Information Systems. 2018. ESRI ArcGIS Software.

U.S. Department of Energy, Environmental Management Nevada. 2017a. *Corrective Action Decision Document/Corrective Action Plan for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion (TTR), Tonopah Test Range, Nevada*, Rev. 0, DOE/NV--1560. Las Vegas, NV.

U.S. Department of Energy Environmental Management Nevada Program. 2017b. *Soils Activity Quality Assurance Plan*, Rev. 1, DOE/NV--1478-REV. 1. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office. 2016. *Corrective Action Investigation Plan for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion (TTR) Tonopah Test Range, Nevada*, Rev. 1, DOE/NV--1542. Las Vegas, NV.

U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office. 2014. *Soils Risk-Based Corrective Action Evaluation Process*, Rev. 1, DOE/NV--1475-Rev. 1. Las Vegas, NV.

Yu, C., A.J. Zielen, J.J. Cheng, D.J. LePoire, E. Gnanapragasam, S. Kamboj, J. Arnish, A. Wallo III, W.A. Williams, and H. Peterson. 2001. *User's Manual for RESRAD Version 6*, ANL/EAD-4. Argonne, IL: Argonne National Laboratory, Environmental Assessment Division. (Version 7.0 released in April 2014.)

Appendix E

Waste Disposition Documentation

(211 Pages)

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18001 with container number 413001 and 413002 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

s/s Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		12/18/17
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		12/18/2017
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18002 with container number 413003 and 413004 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		12/18/17
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		12/18/2017
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18003 with container number 413005 and 413006 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		12/18/17
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		12/18/2017
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18004 with container number 413007 and 413008 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	**Organization**	**Title**
/s/ Mark Heser		12/18/17
Signature		**Date**
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	**Organization**	**Title**
/s/ Kevin Conran		12/18/2017
Signature		**Date**

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18005 with container number 413009 and 413010 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		12/18/17
Signature		Date
/s/ Kevin Conran	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		12/18/2017
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18006 with container number 413011 and 413012 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		12/18/17
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		12/18/2017
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18007 with container number 413013 and 413014 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/22/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Justin Arredondo		01/23/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18008 with container number 413015 and 413016 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/22/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		01/23/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18009 with container number 413017 and 413019 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/20/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		01/23/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18010 with container number 413020 and 413021 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/22/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		01/23/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18011 with container number 413018 and 413022 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/22/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		01/23/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18012 with container number 413023 and 413024 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/23/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		1-24-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18013 with container number 413025 and 413026 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/23/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		1-24-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18014 with container number 413027 and 413028 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/23/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		1-24-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18015 with container number 413029 and 413030 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/23/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		1-24-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18016 with container number 413031 and 413032 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/23/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		1-24-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18017 with container number 413033 and 413034 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	**Organization**	**Title**
/s/ Mark Heser		1/24/18
Signature		**Date**
/s/ Robert Minton	Area 5 / RWMC	LLW SPECIALIST
Received by	**Organization**	**Title**
/s/ Robert Minton		01/25/2018
Signature		**Date**

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18018 with container number 413036 and 413037 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/24/18
Signature		Date
/s/ Robert Minton	AREA 5 / RWMC	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		1-25-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18019 with container number 413038 and 413039 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/24/18
Signature		Date
/s/ Robert Minton	AREA 5/RWMC	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		1-25-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18020 with container number 413040 and 413042 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/24/18
Signature		Date

/s/ Robert Minton	AREA5 /RWMC	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		1-25-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18022 with container number 413045 and 413046 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/24/18
Signature		Date
/s/ Robert Minton	AREA5 /RWMC	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		1-25-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18021 with container number 413043 and 413044 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/25/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		1-30-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18023 with container number 413047 and 413048 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/25/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		1-30-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18024 with container number 413051 and 413052 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/25/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		1-30-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18025 with container number 413054 and 413055 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/25/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		1-30-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18026 with container number 413056 and 413057 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/25/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		1-30-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18027 with container number 413058 and 413059 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/30/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		01/31/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18028 with container number 413060 and 413061 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/30/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		01/31/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18029 with container number 413062 and 413063 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/30/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		01/31/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18030 with container number 413064 and 413065 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/30/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		01/31/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18031 with container number 413066 and 413067 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/30/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		01/31/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18032 with container number 413068 and 413069 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/31/18
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/01/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18033 with container number 413070 and 413071 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/31/18
Signature		Date
/s/ Kevin Conran	NSTS / RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/01/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18034 with container number 413072 and 413073 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/31/18
Signature		Date
/s/ Kevin Conran	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/01/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18035 with container number 413074 and 413075 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/31/18
Signature		Date
/s/ Kevin Conran	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/01/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18036 with container number 413076 and 413077 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		1/31/18
Signature		Date
/s/ Kevin Conran	NSTS / RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/01/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18037 with container number 413078 and 413080 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/1/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		02/05/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18038 with container number 413081 and 413082 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/1/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		02/05/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18039 with container number 413083 and 413084 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/1/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		02/05/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18040 with container number 413085 and 413086 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/1/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		02/05/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18041 with container number 413087 and 413089 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/1/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		02/05/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18042 with container number 413090 and 413091 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/1/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		2-6-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18043 with container number 413092 and 413093 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/1/18
Signature		Date
/s/ Robert Minton	[illegible]	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		2-6-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18044 with container number 413094 and 413095 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/1/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		2-6-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18045 with container number 413096 and 413097 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/1/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		2-6-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18046 with container number 413098 and 413099 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	**Organization**	**Title**
/s/ Mark Heser		2/1/18
Signature		**Date**
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	**Organization**	**Title**
/s/ Robert Minton		2-6-18
Signature		**Date**

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18047 with container number 413100 and 413101 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/6/18
Signature		Date
/s/ Kevin Conran	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/07/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18048 with container number 413102 and 413103 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/6/17
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/07/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18049 with container number 413104 and 413105 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/6/18
Signature		Date
/s/ Kevin Conran	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/07/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18050 with container number 413106 and 413107 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/6/18
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/07/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18051 with container number 413108 and 413109 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/6/18
Signature		Date
/s/ Kevin Conran	RWMC / MSTS	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/07/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18052 with container number 413110 and 413111 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		02/07/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		02/08/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18053 with container number 413112 and 413113 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		02/05/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW/Specialist
Received by	Organization	Title
/s/ Justin Arredondo		02/08/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18054 with container number 413114 and 413115 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		02/08/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18055 with container number 413116 and 413117 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		02/08/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18056 with container number 413118 and 413119 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		02/08/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18057 with container number 413120 and 413121 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	**Organization**	**Title**
/s/ Mark Heser		2/12/18
Signature		**Date**
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	**Organization**	**Title**
/s/ Kevin Conran		02/13/2018
Signature		**Date**

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18058 with container number 413122 and 413123 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/12/18
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/13/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18059 with container number 413124 and 413125 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/12/18
Signature		Date
/s/ Kevin Conran	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/13/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18060 with container number 413126 and 413127 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/12/18
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/13/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18061 with container number 413128 and 413129 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/12/18
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/13/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18062 with container number 413130 and 413131 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		02/13/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		02/14/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18063 with container number 413132 and 413133 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		02/15/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		02/14/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18064 with container number 413134 and 413135 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		02/13/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		02/14/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18065 with container number 413136 and 413137 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		02/13/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		02/14/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18066 with container number 413138 and 413139 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/6/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW, Specialist
Received by	Organization	Title
/s/ Justin Arredondo		02/14/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18067 with container number 413140 and 413141 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/14/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		2-15-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18068 with container number 413142 and 413143 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/14/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		2-15-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18069 with container number 413144 and 413145 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/14/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		02/15/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18070 with container number 413146 and 413147 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		02/15/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		02/15/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18071 with container number 413148 and 413149 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		02/15/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		02/15/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18072 with container number 413150 and 413151 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/15/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Justin Arredondo		02/20/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18073 with container number 413152 and 413153 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/15/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		02/21/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18074 with container number 413154 and 413155 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/15/18
Signature		Date
/s/ Robert Minton	NSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		02/22/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18075 with container number 413156 and 413157 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/15/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		02/26/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18076 with container number 413158 and 413159 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		2/15/18
Signature		Date
/s/ Kevin Conran	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		02/27/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18077 with container number 413160 and 413161 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		03/20/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18078 with container number 413162 and 413163 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		03/20/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18079 with container number 413164 and 413165 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		03/20/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18080 with container number 413166 and 413167 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		03/20/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18081 with container number 413168 and 413169 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		03/20/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18082 with container number 413170 and 413171 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/8/18
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		03/19/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18083 with container number 413172 and 413173 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/8/18
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		03/19/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18084 with container number 413174 and 413175 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/8/18
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		03/19/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18085 with container number 413176 and 413177 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/8/18
Signature		Date
/s/ Kevin Conran	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		03/19/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18086 with container number 413178 and 413179 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/8/18
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		03/19/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18087 with container number 413180 and 413181 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/21/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		03/22/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18088 with container number 413182 and 413183 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/21/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		03/22/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18089 with container number 413184 and 413185 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/21/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		03/22/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18090 with container number 413186 and 413187 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/21/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		3-22-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18091 with container number 413188 and 413189 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/21/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		03/22/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18092 with container number 413190 and 413191 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/21/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		03-26-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18093 with container number 413192 and 413193 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/22/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Justin Arredondo		03/26/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18094 with container number 413194 and 413195 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/22/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW, Specialist
Received by	Organization	Title
/s/ Justin Arredondo		03-26-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18095 with container number 413196 and 413197 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	**Organization**	**Title**
/s/ Mark Heser		3/22/18
Signature		**Date**
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	***Organization***	**Title**
/s/ Justin Arredondo		03-26-18
Signature		**Date**

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18096 with container number 413198 and 413199 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Shipped by	Organization	Title
Mark Heser	Navarro	LLW Waste Coordinator

Signature	Date
/s/ Mark Heser	3/22/18

Received by	Organization	Title
/s/ Justin Arredondo	MSTS	L.L.W. Specialist

Signature	Date
/s/ Justin Arredondo	03-26-18

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18097 with container number 413200 and 413201 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	**Organization**	**Title**
/s/ Mark Heser		3/26/18
Signature		**Date**
/s/ Jared Guches	MSTS	LLW Specialist
Received by	**Organization**	**Title**
/s/ Jared Guches		3/27/2018
Signature		**Date**

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18098 with container number 413202 and 413203 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/26/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		3-27-2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18099 with container number 413204 and 413205 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/26/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		3/27/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18100 with container number 413206 and 413207 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	**Organization**	**Title**
/s/ Mark Heser		3/26/18
Signature		**Date**
/s/ Jared Guches	MSTS	LLW Specialist
Received by	**Organization**	**Title**
/s/ Jared Guches		3/27/2018
Signature		**Date**

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18101 with container number 413208 and 413209 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/26/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		3/27/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18102 with container number 413210 and 413211 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/27/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		3-28-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18103 with container number 413212 and 413213 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/27/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		3-28-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18104 with container number 413214.and 413215 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/27/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		3-28-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18105 with container number 413216 and 413217 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/27/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		3-28-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18106 with container number 413218 and 413219 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/27/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		3-28-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18107 with container number 413220 and 413221 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/28/18
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		03/29/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18108 with container number 413222 and 413223 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	**Organization**	**Title**
/s/ Mark Heser		3/28/18
Signature		**Date**
/s/ Kevin Conran	MSTS / RWMC	WASTE SPECIALIST
Received by	**Organization**	**Title**
/s/ Kevin Conran		03/29/2018
Signature		**Date**

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18109 with container number 413224 and 413225 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/28/18
Signature		Date
/s/ Kevin Conran	MSTS/ RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		03/29/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18110 with container number 413226 and 413227 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/28/18
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		03/29/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18111 with container number 413228 and 413229 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		3/28/18
Signature		Date
/s/ Kevin Conran	NSTS / RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		03/29/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18112 with container number 413230 and 413231 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		5/30/18
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	LOW LEVEL WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		06/04/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18113 with container number 413232 and 413233 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		5/30/18
Signature		Date
/s/ Kevin Conran	NSTS / RWMC	Low LEVEL WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		06/04/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18114 with container number 413234 and 413235 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		5/31/18
Signature		*Date*
/s/ Kevin Conran	MSTS/RWMC	LOW LEVEL WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		06/04/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18115 with container number 413236 and 413237 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Shipped by	Organization	Title
Mark Heser	Navarro	LLW Waste Coordinator

Signature	Date
/s/ Mark Heser	5/31/18

Received by	Organization	Title
/s/ Kevin Conran	MSTS / RWMC	LOW LEVEL WASTE SPECIALIST

Signature	Date
/s/ Kevin Conran	06/04/2018

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18116 with container number 413238 and 413239 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		5/31/18
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	Low Level Waste Specialist
Received by	Organization	Title
/s/ Kevin Conran		06/04/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18117 with container number 413240 and 413241 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		06/05/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		6-5-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18118 with container number 413242 and 413243 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/4/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		06/05/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18119 with container number 413244 and 413245 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Shipped by	Organization	Title
Mark Heser	Navarro	LLW Waste Coordinator

Signature		Date
/s/ Mark Heser		6/4/18

Received by	Organization	Title
/s/ Robert Minton	MSTS	LLW SPECIALIST

Signature		Date
/s/ Robert Minton		06/05/2018

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18120 with container number 413246 and 413247 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/4/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		06/05/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18121 with container number 413248 and 413249 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/4/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPECIALIST
Received by	Organization	Title
/s/ Robert Minton		06/05/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18123 with container number 413252 and 413253 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		06/06/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/06/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18124 with container number 413254 and 413255 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		06/06/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/06/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18125 with container number 413256 and 413257 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/5/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/06/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18126 with container number 413258 and 413259 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/5/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/06/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18127 with container number 413260 and 413261 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		06/06/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/07/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18128 with container number 413041 and 413050 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		06/07/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/07/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18129 with container number 413053 and 413088 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		06/07/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/07/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18130 with container number 413262 and 413263 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		06/07/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/07/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18131 with container number 413264 and 413265 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		06/07/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/07/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18132 with container number 413266 and 413267 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/11/2018
Signature		*Date*

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18133 with container number 413268 and 413269 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/11/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18134 with container number 413270 and 413271 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/11/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18135 with container number 413272 and 413273 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/11/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18136 with container number 413274 and 413275 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/7/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/11/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18137 with container number 413276 and 413277 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/11/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	*Organization*	*Title*
/s/ Justin Arredondo		06/12/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18138 with container number 413278 and 413279 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/11/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/12/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18139 with container number 413280 and 413281 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/11/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW, Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/12/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18140 with container number 413282 and 413283 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/11/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/12/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18141 with container number 413284 and 413285 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/11/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/12/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18142 with container number 413286 and 413287 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/12/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/13/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18143 with container number 413288 and 413289 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/12/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/13/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18144 with container number 413290 and 413291 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/12/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/13/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18145 with container number 413292 and 413293 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/12/18
Signature		Date
/s/ Jared Guches	MSTM	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/13/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18146 with container number 413294 and 413295 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/12/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/13/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18147 with container number 413296 and 413297 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/13/18
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	LOW LEVEL WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		06/14/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18148 with container number 413298 and 413299 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/13/18
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	LOW LEVEL WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		06/14/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18149 with container number 413300 and 413301 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/13/18
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	LOW LEVEL WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		06/14/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18150 with container number 413302 and 413303 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/13/18
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	Low Level Waste Specialist
Received by	Organization	Title
/s/ Kevin Conran		06/14/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18151 with container number 413304 and 413305 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/13/18
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	LOW LEVEL WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		06/14/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18152 with container number 413306 and 413307 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/14/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/18/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18153 with container number 413308 and 413309 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/14/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/18/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18154 with container number 413310 and 413311 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/14/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/18/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18155 with container number 413312 and 413313 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/14/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/18/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18156 with container number 413314 and 413315 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/14/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		06/18/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18157 with container number 413316 and 413317 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/18/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/19/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18158 with container number 413318 and 413319 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/18/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/19/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18159 with container number 413320 and 413321 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/18/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/19/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18160 with container number 413322 and 413323 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/18/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/19/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18161 with container number 413324 and 413325 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/18/18
Signature		Date
/s/ Jared Guches	MSTS	JG 06/19/18 ~~NT3~~ LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/19/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 0, shipment number ITL18162 with container number 413326 and 413251 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		6/18/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		06/19/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18163 with container number 413327 and 413328 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/10/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/11/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18164 with container number 413329 and 413330 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/10/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/11/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18165 with container number 413331 and 413332 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/10/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/11/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18166 with container number 413333 and 413334 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/10/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/11/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18167 with container number 413335 and 413336 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/10/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/11/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18168 with container number 413337 and 413338 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07-12-2018
Signature		Date
/s/ Kevin Conran	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/12/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18169 with container number 413339 and 413340 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07-12-2018
Signature		Date
/s/ Kevin Conran	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/12/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18170 with container number 413341 and 413347 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07-12-2018
Signature		Date
/s/ Kevin Conran	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/12/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18171 with container number 413344 and 413348 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07-12-2018
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/12/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18172 with container number 413345 and 413346 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07-12-2018
Signature		Date
/s/ Kevin Conran	NSTS / RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/12/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18173 with container number 413349 and 413350 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/16/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Justin Arredondo		07/16/18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18174 with container number 413351 and 413352 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/16/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLw. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		07/16/18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18175 with container number 413353 and 413354 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/16/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLw. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		07/16/18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18176 with container number 413355 and 413356 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/16/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		07/16/18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18177 with container number 413357 and 413368 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/16/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		07/16/18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18178 with container number 413359 and 413380 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/16/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/17/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18179 with container number 413361 and 413362 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/16/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		07/17/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18180 with container number 413363 and 413364 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/16/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/17/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18181 with container number 413365 and 413366 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/16/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/17/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18182 with container number 413367 and 413369 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/16/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/17/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18183 with container number 413370 and 413371 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/17/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		07/18/18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18184 with container number 413372 and 413373 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/17/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW, Specialist
Received by	Organization	Title
/s/ Justin Arredondo		07/18/18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18185 with container number 413374 and 413375 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/17/18
Signature		Date
/s/ Kevin Conran	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/18/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18186 with container number 413376 and 413377 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/17/18
Signature		Date
KEVIN P. CONRAN	NSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/18/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18187 with container number 413378 and 413379 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/17/18
Signature		Date
/s/ Kevin Conran	MSTS/ RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/18/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18188 with container number 413381 and 413382 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/18/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPEC.
Received by	Organization	Title
/s/ Robert Minton		7-19-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18189 with container number 413383 and 413384 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/18/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPEC.
Received by	Organization	Title
/s/ Robert Minton		7-19-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18190 with container number 413385 and 413386 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/18/18
Signature		Date
/s/ Robert Minton	MSTS	LLW Spec.
Received by	Organization	Title
/s/ Robert Minton		7-19-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18191 with container number 413387 and 413388 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/18/18
Signature		Date
/s/ Robert Minton	MSTS	LLW Spec.
Received by	Organization	Title
/s/ Robert Minton		7-19-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18192 with container number 413389 and 413390 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/18/18
Signature		Date
/s/ Robert Minton	MSTS	LLW Spec.
Received by	Organization	Title
/s/ Robert Minton		7-19-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18193 with container number 413391 and 413392 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/19/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/23/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18194 with container number 413393 and 413394 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/19/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/23/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18195 with container number 413395 and 413396 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/19/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/23/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18196 with container number 413397 and 413398 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/19/18
Signature		Date
/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/23/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18197 with container number 413399 and 413400 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/19/18
Signature		Date

/s/ Jared Guches	MSTS	LLW Specialist
Received by	Organization	Title
/s/ Jared Guches		07/23/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18198 with container number 413401 and 413402 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/23/18
Signature		Date
/s/ Kevin Conran	MSTS/RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/24/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18199 with container number 413403 and 413404 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/23/18
Signature		Date
/s/ Kevin Conran	RWMC/MSTS	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/24/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18200 with container number 413405 and 413406 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/23/18
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/24/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18201 with container number 413407 and 413408 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/23/18
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/24/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18202 with container number 413409 and 413410 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/23/18
Signature		Date
/s/ Kevin Conran	MSTS / RWMC	WASTE SPECIALIST
Received by	Organization	Title
/s/ Kevin Conran		07/24/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18203 with container number 413411 and 413412 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/24/18
Signature		Date
/s/ Robert Minton	NSTS	LLW SPEC.
Received by	Organization	Title
/s/ Robert Minton		07/25/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18204 with container number 413413 and 413414 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/24/18
Signature		Date
/s/ Robert Minton	MSTS	LLW. SPEC.
Received by	Organization	Title
/s/ Robert Minton		7-25-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18205 with container number 413415 and 413416 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/24/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPEC.
Received by	Organization	Title
/s/ Robert Minton		7-25-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18206 with container number 413417 and 413418 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/24/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPEC.
Received by	Organization	Title
/s/ Robert Minton		07/25/2018
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18207 with container number 413419 and 413420 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		07/24/18
Signature		Date
/s/ Robert Minton	MSTS	LLW SPEC.
Received by	Organization	Title
/s/ Robert Minton		7-25-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18208 with container number 413421 and 413422 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/25/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		07-26-18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18209 with container number 413423 and 413424 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/25/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLw. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		07/26/18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18210 with container number 413425 and 413426 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Shipped by	Organization	Title
Mark Heser	Navarro	LLW Waste Coordinator

Signature	Date
/s/ Mark Heser	7/25/18

Received by	Organization	Title
/s/ Justin Arredondo	MSTS	LLW. Specialist

Signature	Date
/s/ Justin Arredondo	07-26-18

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18211 with container number 413427 and 413428 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/25/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		07/26/18
Signature		Date

Certificate of Disposal

This is to certify that the Waste Stream No. LITN-000000014, Revision 1, shipment number ITL18212 with container number 413429 and 413430 was shipped and received at the Nevada National Security Site Radioactive Waste Management Complex in Area 5 for disposal as stated below.

Mark Heser	Navarro	LLW Waste Coordinator
Shipped by	Organization	Title
/s/ Mark Heser		7/25/18
Signature		Date
/s/ Justin Arredondo	MSTS	LLW. Specialist
Received by	Organization	Title
/s/ Justin Arredondo		07/26/18
Signature		Date

Appendix F

Modifications to the Post-Closure Plan

F.1.0 Modifications to the Post-closure Plan

This appendix is not applicable to CAU 413, because the site is being clean closed and a post-closure plan is not required.

Appendix G

Analytical Test Results

G.1.0 Analytical Test Results

This appendix presents the analytical results for the plot samples collected at CAU 413. The analytical results of the investigation samples that were used to calculate doses are presented in Table G.1-1. The methods to convert the analytical results to dose (see Tables D.3-1 and D.4-2 for doses) are contained in the Soils RBCA document (NNSA/NFO, 2014).

Table G.1-1
Results for Gamma-Emitting Radionuclides Detected above MDCs

Zone	Sample Location	Sample Number	COPCs (pCi/g)	
			Am-241	Th-232
0	X07	AB3A083	77.8	2.04
		AB3A083a	109	2
		AB3A084	111	2.36
1a	X09	AB3A086	136	2.26
1b	X10	AB3A087	53.5	2.31
2	X08	AB3A085	291	2.02
3	X03	AB3A074	91.8	1.97
		AB3A075	26.6	2.05
4	X11	AB3A088	144	2.06
6	X06	AB3A080	14.6	2.07
		AB3A081	19.1	2.35
		AB3A082	22.1	2.36

MDC = Minimum detectable concentration

Appendix H

Verification Sample Location Coordinates

H.1.0 Verification Sample Location Coordinates

The center of each verification sample plot at the CAU 413 site was surveyed using a GPS instrument. Survey coordinates for these locations are listed in Table H.1-1.

Table H.1-1
Verification Sample Location Coordinates for CAU 413

Zone	Sample Location	Easting[a]	Northing[a]
0	X07	534123.9	4179063.5
1a	X09	534187.7	4179167.8
1b	X10	534239.6	4179054.1
2	X08	534039.7	4179163.2
3	X03	534086.0	4179196.1
4	X11	534056.2	4179191.3
6	X06	534098.5	4179204.3

Note: All coordinates listed are for the center of the sample plot.
[a]UTM Zone 11, NAD 1927 (U.S. Western) in meters.

NAD = North American Datum
UTM = Universal Transverse Mercator

Appendix I

Additional Operational Information about Excavation and Waste-Handling Activities

I.1.0 Additional Operational Information about Excavation and Waste-Handling Activities

I.1.1 Purpose

Appendix I describes and outlines the various planning and operational activities that occurred throughout the CAU 413 project, and provides an understanding of each phase of the project.

Clean closure activities at CAU 413 (CSII) started in September 2017 and concluded in July 2018. Radiological operations began in November 2017. The clean closure of CAU 413 consisted of the removal of surface and subsurface soil and debris that exceeded or were assumed to exceed the FAL of 25 mrem/CW-yr. This included the removal of approximately 2,866 m^3 of soil and debris. The depth of removal for contaminated surface soil ranged from 2 to 3 in., and the depth of buried debris ranged from the surface to approximately 7 ft bgs.

To allow for safe and efficient control of site operations, areas of the site were subdivided into operational areas (e.g., soil stockpile, waste packaging, waste staging). For nuclear safety control, volume limits for each operational zone were established, and the areas requiring remediation were subdivided into seven separate zones (i.e., Zones 0 through 6). This aided in the overall communication and understanding of which zones were active or complete. Figure I.1-1 is an aerial view of the site with each remediation zone and the operational areas identified.

I.1.2 Planning/Pre-Mobilization Activities

The overall planning of this project followed the Integrated Safety Management System (ISMS), which allows all team members to engage in the development of the work control documents and the strategies for field activities. This included the identification of required equipment and what level of training would be required for the safe operations during remediation. It was also determined that several mock-up activities would be required after mobilization. Mock-ups or dry runs were performed to familiarize the crew with work processes related to excavation, waste packaging, and other activities before beginning intrusive activities within the contamination areas (CAs).

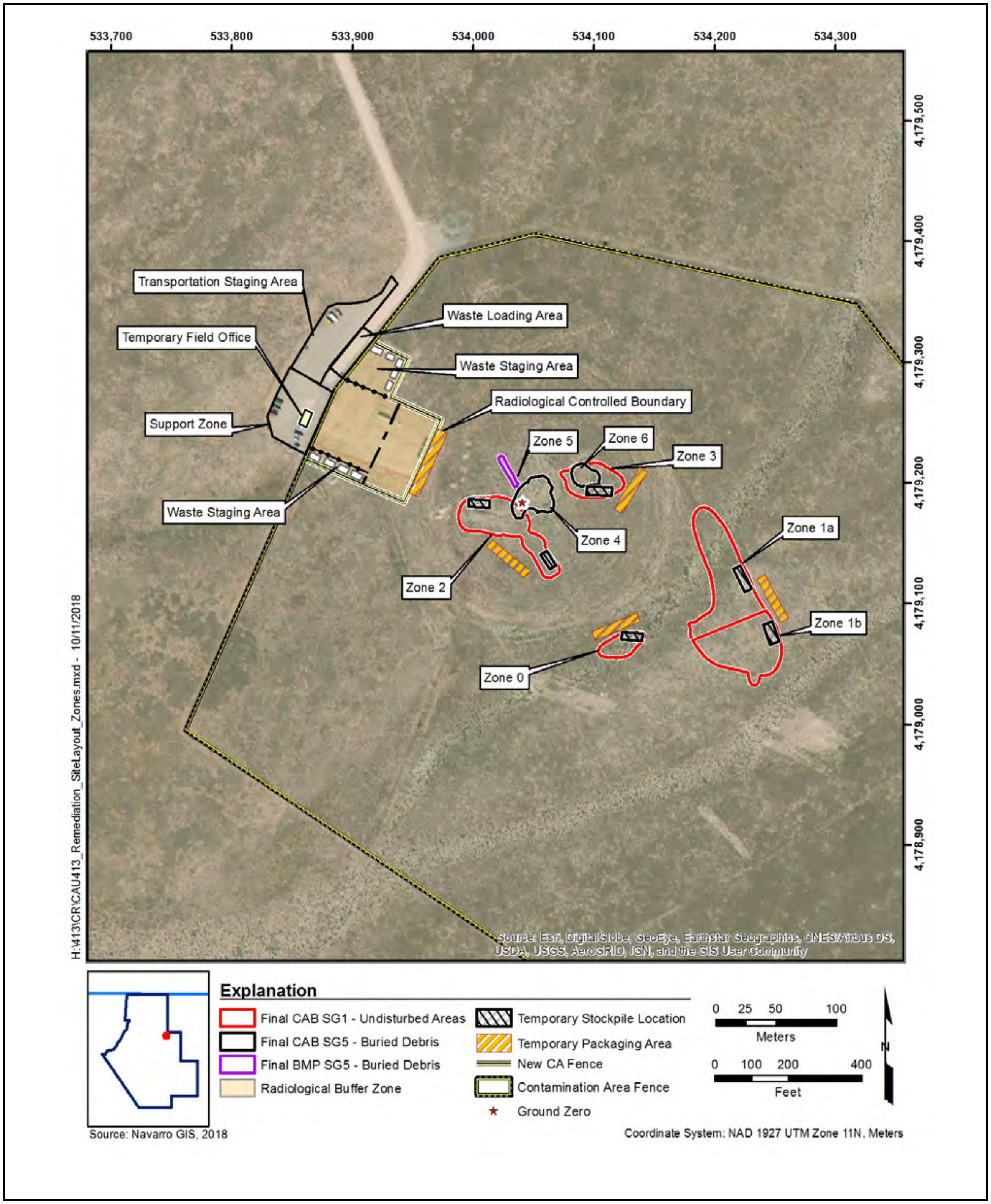

Figure I.1-1
Site Layout

The primary mock-up for this project was the packaging of waste material into the soft-sided containers (bags), which was a relatively new operation for the team. Numerous mock-ups were undertaken to ensure that while using “clean” dirt material, the team understood the most efficient and safe way to package the waste. This also included the use of loading frames that held the bags firmly while the waste was being loaded into the bags. Additional mock-ups focused on removing loaded bags from the loading frames and using the lifting frame attachment that was used with the forklift to transfer the bags.

Other mock-ups/dry runs included the set up and initial use of other equipment:

- Forklift
- Water trucks and water tank
- Backhoe
- Front-end loader

I.1.3 Mobilization

Mobilization to the site took approximately four weeks as equipment that had been purchased or leased was received. The initial listing of equipment included the following:

- Five loading frames used to hold the bags/containers during waste loading operations
- A lifting frame that was used on a forklift for movement of waste bags
- Front-end loader with a normal bucket, a fork attachment for lifting the loading frames, and a specialized loading bucket that was used for bag loading. The bucket has a funnel-shaped opening on the bottom and a slide gate for releasing the soil from the bucket. This aided in the reduction of fugitive dust generation.
- A backhoe for digging and other operations
- A water storage tank that was used to store water for dust suppression
- Two water trucks for dust-suppression activities
- A forklift to move materials and waste containers
- Office and storage containers

- A supply of the soft-sided waste packages (bags)
- Numerous operational supplies (e.g., PPE, hand tools, respirators)

I.1.4 Site Preparation

Site preparation included the following activities:

- Making improvements to the access road.
- Generating and improving the waste staging area and truck staging areas for shipping purposes.
- Removing interior fencing, barbed-wire fencing, and “T” posts to allow access to the excavation area.
- Staking/flagging of the remediation areas using Geographic Information Systems (GIS) to ensure that the boundaries of the differing “remediation zones” were clearly delineated.
- Establishing radiological boundaries to ensure these areas were correctly bounded and posted. This ensured the workers clearly understood the signage and the radiological work permits (RWPs) that would be used during this project.
- Setting up the portable office and storage containers.
- Setting up Radiological Control equipment and trailers.
- Setting up low-volume air monitoring stations to monitor potential airborne radiological contamination in the general area at the site.

I.1.5 Radiological Control

The remediation of CSII exposed workers to radioactive hazards, primarily Pu-239. Radioactive contaminants suspended in air have a potential to be inhaled by site workers, which in turn could result in worker radiological doses. The excavation of contaminated soils at CSII was assumed to suspend radioactive particles in air. Therefore, it was necessary to implement controls to minimize worker exposures. Work controls were established and documented by approved RWPs. As exposure to airborne alpha-emitting radionuclides was possible, exposures were maintained as low as reasonably achievable (ALARA) by the use of PPE. Air monitoring was performed to document concentrations of airborne contaminants. Workers exposed to surface and airborne contamination used combinations of anti-contamination clothing and powered air purifying respirators. Personal breathing zone air samplers were used to measure each worker's breathing zone at all times while inside CAs and HCAs. To confirm that contaminants were not migrating outside CAs, stationary air sampling (low-volume air samplers) and routine contamination monitoring was conducted outside the contaminated areas. No contamination was detected outside CAs.

I.1.6 Excavation Activities

Excavation activities began with a methodical level of activity to ensure that the team had the opportunity to ensure the task was performed safely and radiologically controlled. Workers entered radiological areas with the required PPE to ensure they were appropriately protected from radiological hazards. Radiological control technicians (RCTs) were present continuously to monitor and control activities.

Excavation of soil/debris was completed using a Caterpillar 966 front-end loader. Soil and debris was stockpiled before packaging. Dust-suppression techniques were used to minimize the generation of dust and other windborne particulates. A 2,000-gallon water truck was used within the CAs, and a 4,000-gallon water truck was used outside the CAs to apply water for dust control.

The soil/debris was then loaded into soft-sided packages (which were placed within the loading frames) near the stockpile, using the front-end loader with a bag-loading bucket. The bag-loading bucket has a funnel shaped opening on the bottom and a slide gate for releasing the soil from the bucket. This aided in minimizing dust generation during the loading process.

When all five bags/loading frames were loaded, the operator placed the forks onto the loader and transferred the loading frames to the Rad control line. Working with team members inside the CA and others outside, the bags were removed from the frames one at a time. The forklift has a lifting frame attachment that allows the bags to be lifted using the integrated lifting straps built into the bags. Radiological surveys were performed before each bag was removed from the CA. Once the bag was verified to be "rad released," it was placed into the waste storage area.

FIDLER Surveys: A FIDLER was used to measure the concentration of Am-241 (59 kiloelectron volt [keV] gamma photon) in soil. During soil excavation, the FIDLER was used to provide RCTs with information necessary to direct excavation and to confirm when contamination was below the DQO for residual radioactivity. After excavation was completed, the FIDLER was used to perform final walkover surveys to identify the location of the verification sampling plot. The location of the verification sampling plot was biased to the location where the maximum FIDLER measurements in the zone of interest were measured.

Geophysical Surveying: In zones where debris was identified and removed, an effort was put forth to ensure all debris was excavated. Geophysical surveying was performed after removal to ensure that all debris had been located and removed.

I.1.7 Size Reduction of Large Debris Items/Other Unique Debris Items

Several large and still intact pieces of the bunker were unearthed in remediation Zone 4. A John Deere backhoe fitted with a hydraulic hammer was used to size-reduce the large concrete debris. Rebar ranging in size from 3/4 inch to 1-1/4 inch was size-reduced using a heavy-duty battery-powered shear and a porta-band saw. Large metal debris was folded into smaller, more manageably sized pieces using the backhoe bucket.

Additionally, a large area within Zone 4 had metal conduit with electrical cables buried. This debris was size-reduced and prepared for packaging.

The size-reduced debris material was co-mingled with soil material into the bags, ensuring that the bags were protected as they were loaded. This proved to work well as a method to properly containerize the waste material.

I.1.8 Waste Management Activities

Waste management was a significant portion of the project. Waste packages were removed from the RCA and placed on pallets within the staging area. Radiological surveys were performed before transfer into the staging area. Containers were also weighed during the removal process.

Within the waste staging area, filled waste packages were placed onto wood pallets, labeled, and certified in preparation for shipment/transport and disposal. Waste containers were also tarped while in the staging area to ensure that precipitation did not impact the containers.

In order to facilitate the waste shipping process, more than 100 waste packages were generated before initiating a shipping campaign. As the certification process was performed, tarps on the containers were removed so that inspections could occur. This included integrity inspections, labels and marking verifications, tamper-indicating device verifications, and certification labels added.

Navarro has an approved/certified program related to waste disposal site at the NNSS. Under this program, the Waste Certification Official certifies each package to ensure that all requirements within the *Nevada National Security Site Waste Acceptance Criteria* (NNSSWAC) (NNSA/NFO, 2016) are met.

I.1.9 Transportation of Waste Containers

Containers were transported by a subcontract commercial transport company. Campaigning the waste shipments allowed for efficient use of the transportation contractor's equipment and personnel.

Soft-sided packages were loaded two per flatbed trailer and secured for transport to the Area 5 RWMC at the NNSS. Due to the weight of each soft-sided package (typically 18,000 to 20,000 pounds each), a maximum of two packages could be placed onto a flatbed trailer in accordance with U.S. Department of Transportation regulations. The two bags were also tarped using specialized tarps provided by the transportation subcontractor. Waste shipments occurred Monday through Thursday, at a rate of five shipments per day, for a total of 40 soft-sided packages shipped per week. Generally, a shipping campaign would include the transport of approximately 120 bags during each campaign over a three-week period.

LLW was removed from CSII and transported to the NNSS Area 5 RWMC for disposal in accordance with the NNSSWAC (NNSA/NFO, 2016). All LLW met the characterization, packaging, certification, and shipping criteria established in the NNSSWAC.

I.1.10 Summary of Waste Volumes Dispositioned

The project generated 422 soft-sided containers, with 211 shipments to the Area 5 RWMC. No transportation incidents occurred during the project. The remediation of soil/debris at CSII generated 2,866 m^3 of waste material.

I.1.11 Additional Verification

Stomp and Tromp: The stomp and tromp method, developed at the NNSS in the late 1990s, is a survey technique that is used to quantify the levels of removable contamination present on soil surfaces. Once biased sampling locations were selected, the stomp and tromp method was used to quantify residual removable contamination. The results of the stomp and tromp survey were used to compare to DQOs associated with removable contamination.

I.1.12 Grading of Excavated Areas

Before demobilization from CSII, limited grading of the excavated area occurred, using clean soil that had previously been placed on the site. In the future, site restoration may include recontouring and backfilling as necessary, with long-term soil stabilization accomplished by natural revegetation of the remediated areas.

I.1.13 Photos

Excavation and waste-handling activities are shown in Figures I.1-2 through I.1-26.

10/30/2017 (PIRDY-57-218102)

Figure I.1-2
Mock-up Using Bag-Filling Bucket (clean soil) Facing North

10/24/2017 (PIRDY-57-218142)

Figure I.1-3
Mock-up of Loading Bags with Clean Soil Facing North

10/24/2017 (PIRDY-57-218153)

Figure I.1-4
Mock-up Moving Bags Suspended from Lifting Frame Facing North

10/24/2017 (PIRDY-57-218123)

Figure I.1-5
Mock-up Dust Suppression Facing North

11/01/2017 (PIRDY-57-218046)

Figure I.1-6
Site Setup Pad Grading and Dust Suppression Facing Southeast

11/07/2017 (PIRDY-57-218023)

Figure I.1-7
Loading Frames Prepared for Waste Packaging Facing South

02/14/2018 (PIRDY-57-218348)

Figure I.1-8
Overview of Site Layout Facing Southeast

02/14/2018 (PIRDY-57-218288)

Figure I.1-9
Dust-Suppression Activities in Site Support Area Facing Southeast

11/01/2017 (PIRDY-57-218053)

Figure I.1-10
Example of PPE and Low-Volume Air Sampler Facing South

03/07/2018 (PIRDY-57-219536)

Figure I.1-11
Excavation Activities Facing Southeast

03/27/2018 (PIRDY-57-219504)

Figure I.1-12
Debris Excavation Activities Facing Southeast

05/03/2018 (PIRDY-57-220563)

Figure I.1-13
Soil Excavation Activities Facing Southeast

05/15/2018 (PIRDY-57-220534)

Figure I.1-14
Remediated Area with Debris in Background Facing Southeast

05/22/2018 (PIRDY-57-220516)

Figure I.1-15
Debris Size Reduction Using Hydraulic Hammer Facing Northeast

06/16/2018 (PIRDY-57-220479)

Figure I.1-16
Size-Reduced Debris Facing Northeast

03/01/2018 (PIRDY-57-219562)

Figure I.1-17
Verification Using Geophysical Surveys Facing Southeast

10/31/2017 (PIRDY-57-218117)

Figure I.1-18
Filling Bags Using Bag-Filling Bucket Facing Northeast

02/06/2018 (PIRDY-57-218368)

Figure I.1-19
Forklift Transferring Frame and Bag to Radiological Controlled Boundary Facing North

11/07/2017 (PIRDY-57-218030)

Figure I.1-20
Closing and Securing Bag Facing Southeast

02/14/2018 (PIRDY-57-218352)

Figure I.1-21
Moving Bag from Radiological Controlled Area to Staging Area Facing Southeast

02/06/2018 (PIRDY-57-218359)

Figure I.1-22
Loading Bags on Flatbed Trailer for Transport to Area 5 RWMC for Disposal Facing Northwest

11/21/2017 (PIRDY-57-217972)

Figure I.1-23
Securing and Tarping Loaded Trailers for Transport Facing Northwest

12/14/2017 (PIRDY-57-217934)

Figure I.1-24
Waste Staging Area Facing North

02/06/2018 (PIRDY-57-218364)

Figure I.1-25
Truck Transporting Waste for Disposal Facing Northwest

06/13/2018 (PIRDY-57-220497)

Figure I.1-26
Decontamination of Front-End Loader Facing Northeast

I.2.0 References

NNSA/NFO, see U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office.

U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office. 2016. *Nevada National Security Site Waste Acceptance Criteria*, DOE/NV--325-16-00. Las Vegas, NV.

Appendix J

Theoretical Inadvertent Ordnance Drop Dose Evaluation

J.1.0 Theoretical Worst-Case Inadvertent Ordnance Drop Dose Evaluation

At USAF request, a review was performed to evaluate the dose resulting from an inadvertent ordnance dropped into the area of maximum contamination at CAU 413 after completion of corrective action activities (Location X08). The scenario assumed USAF recommendations that the ordnance would be an MK-84 (the highest-power ordnance that could reasonably be used at the site). The MK-84 has an estimated TNT equivalent of 945 pounds. USAF estimated the maximum dimensions of a crater produced by this device to be 3.66 m in depth and 5.5 m in diameter. Using the diameter of the displaced soil and a contamination depth of 0.05 m, the volume of contaminated soil displaced by the device was estimated as 1.18 m^3. This volume was converted into mass using a soil density of 1,500 kilograms per cubic meter (kg/m^3), resulting in a total mass of 1,770,000 grams (g) of contaminated soil displaced from the detonation.

Model assumptions:

- The entire mass of displaced contaminated soil will be suspended in the dust cloud and remain in the dust cloud without any subsequent deposition.
- The most exposed individual (the receptor) is directly downwind in the center of the migrating plume.
- At the location of the detonation, the plume will have an initial height of 150 m above the ground surface and a radius of 243 m (total volume of 27,826,186 m^3) (USAF assumptions).
- At the distance to the receptor, the plume will have the same concentration of contaminants, as it will not have deposited any contaminated material or increased in volume.
- The plume will travel downwind at a rate of 0.686 meters per second (very calm wind speed conditions).

The maximum dose to the most exposed individual was calculated as shown in Table J.2-1. The activity concentrations (pCi/g) of the detected radionuclides in a surface soil sample taken from the location of maximum residual contamination at the CSII site (Location X08) were multiplied by the total mass of contaminated soil displaced from the detonation (1,770,000 g) to obtain the total radionuclide activities in the displaced soil (pCi). These activities were divided by the volume of the dust plume (27,800,000 m^3) to obtain the activity concentrations for each radionuclide in the dust plume (pCi/m^3). Based on a breathing rate of 1.16 cubic meters per hour (m^3/hr), the receptor inhales 0.23 m^3 of the contaminated plume during the approximately 0.2 hours it takes for the 486-m-wide plume traveling at the calm wind speed of 2,470 meters per hour to pass over. As most of the contaminated soil particles have been shown to be greater than respirable size (greater than 10 micrometers), a respirable fraction of 17 percent was conservatively used to estimate inhaled activities. The activity concentrations for each radionuclide in the dust plume (pCi/m^3) were multiplied by the respirable fraction of 17 percent and by the volume of contaminated dust inhaled (m^3) to obtain the activity of each radionuclide inhaled (pCi). These activities (pCi) were then multiplied by the International Commission on Radiological Protection (ICRP) 72 (Adult) dose conversion factors (ICRP, 1996) (mrem/pCi) shown in Table J.2-2 to obtain the inhaled doses from each radionuclide (mrem). Summing the doses from the radionuclides results in a total estimated dose of approximately 4.3 millirem (mrem).

Table J.2-1
Potential Inhalation Dose from Ordnance Detonation at CSII Location of Maximum Residual Contamination

Isotope	Activity Concentration in the Surface Soil (pCi/g)	Total Activity in Displaced Soil (pCi)	Activity Concentration in the Plume (pCi/m^3)	Activity Inhaled (pCi)	Dose to Most Exposed Individual
Pu-238	29	5.12E+7	1.8	0.1	0.0
Pu-239/240	3,687	6.52E+9	234.4	9.1	4.0
Pu-241	513	9.07E+8	32.6	1.3	0.0
Am-241	291	5.15E+8	18.5	0.7	0.3
Th-232	2	3.57E+6	0.1	0	0
Total					4.3

pCi = Picocurie
pCi/m^3 = Picocuries per cubic meter
Th = Thorium

Table J.2-2
ICRP 72 (Adult) Dose Conversion Factors

Isotope	Activity Concentration in the Surface Soil (pCi/g)	Total Activity in Displaced Soil (pCi)
Pu-238	0.407	mrem/pCi
Pu-239/240	0.444	mrem/pCi
Pu-241	0.00851	mrem/pCi
Am-241	0.3552	mrem/pCi
Th-232	0.407	mrem/pCi

J.2.0 References

ICRP, see International Commission on Radiological Protection.

International Commission on Radiological Protection. 1996. *Annals of the ICRP, Vol. 26(1): ICRP Publication 72: Age-dependent Doses to the Members of the Public from Intake of Radionuclides Part 5, Compilation of Ingestion and Inhalation Coefficients.* Oxford, UK: Pergamon Press.

Appendix K

Nevada Division of Environmental Protection Comments

(16 Pages)

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
1.	Section 1.0, Page 1, 4th Paragraph		Sentence beginning with, "Contaminated soil and debris ...," the phrase, "... excavated areas would be returned to surface conditions compatible with the intended future use of the site." is speculative and makes unwarranted assumptions about future land use. Please remove or rephrase the sentence to include what the intended future use of the site is. If there is USAF guidance/correspondence on the issue, please reference it here.	Replaced sentence with "Contaminated soil and debris would be disposed of at an offsite facility, and excavated areas would be backfilled and recontoured." Inserted before last paragraph of this section: "As determined in the data quality objectives (DQOs) and documented in the CAIP (NNSA/NFO, 2016a), a Construction Worker (CW) land use scenario was determined applicable to the CAU 413 site (Cornish, 2014). This scenario assumes primarily outdoor construction activities that may include road construction/maintenance, underground utilities excavation, and/or target or other structure placement in the vicinity of CAU 413. The most exposed individual in this scenario is defined as an adult construction worker who works at the site for 120 days per year (day/yr), 8 hours per day (hr/day), for a total of 960 hours per year (hr/yr)."
2.	Section 2.1.1, Pages 8-9, Various Paragraphs		Add references to supporting figures, tables, or sections pointing to data showing soil post removal survey results as appropriate.	Cross references to post-removal survey results were added throughout document.
3.	Section 2.1.2, Pages 11-14, Various Paragraphs		Add references to supporting figures, tables, or sections pointing to data showing soil post removal survey results as appropriate.	Cross references to post-removal survey results were added throughout document.

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
4.	Section 2.1.2, Page 11, 1st Paragraph		Last sentence: Is the pipe the only debris item found in Zone 5? Although not part of a landfill, assess its possible purpose and describe any removable contamination found on/in the pipe.	Yes, the pipe was the linear feature identified in the CADD/CAP as Zone 5. Replaced the last sentence with "This pipe is not within the CSM of SG5, as this study group was defined in the CAIP (NNSA/NFO, 2016a) as the release of contaminants to subsurface soil from contaminated soil and debris that was collected and buried at ground zero (GZ) after the CSII test in 1963 and covered with "several feet of clean earth" (AEC/NVOO, 1964). Although the specific purpose of the electrical conduit pipe is unknown, based on process knowledge and field-screening results, there is no reason to suspect that it is contaminated or requires corrective action. However, as a BMP, the pipe was removed and disposed of at the Area 5 RWMC (Figure 2-4)."

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
5.	Section 2.1.2, Page 11, 3rd Paragraph		Describe the range of removable contamination found on metallic debris removed as BMP, and why the action was considered BMP, not required under corrective action.	Deleted the remainder of the paragraph from the sentence starting with "The geophysical survey identified..." and replaced with "The geophysical survey did not identify any other potential areas of buried debris (see Figure D.4-3). The geophysical survey did identify small anomalies of surface or near-surface debris around the GZ area of CAU 413. Radiological surveys in this area did not show elevated readings at these debris locations, and none of the debris had indications of contamination (i.e., black plating) that was seen on previously removed potential source material as described in Section 2.1.6 of the CADD/CAP. Because these debris items were not contaminated and were not buried in a landfill, they are not within the defined scope for SG5 (i.e., contaminated debris that was buried and covered) and, therefore, these items do not require corrective action. However, these debris items were removed and disposed of as LLW at the Area 5 RWMC as a BMP. Therefore, the anomalies associated with the uncontaminated debris items shown in Figures D.4-3 and D.4-4 are no longer present at the site. See Figure 2-5 for an example of metallic debris removed as a BMP from one of the small anomalies."
6.	Section 2.1.2, Page 14, 2nd Paragraph		Last sentence: Clarify why conduit pipe in Zone 5 was not considered buried debris not requiring corrective action but BMP removal.	See response to Comment #4. Replaced the last sentence with "As previously discussed in this section, the conduit pipe in Zone 5 was not contaminated or buried in a landfill, and does not fit the CSM for SG5 (i.e., contaminated debris that was buried and covered). Therefore, it did not require corrective action or verification."

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
7.	Section 2.1.2, Page 14, Last Paragraph		Where are these data summarized? They are not in D.1.4.5 as expected.	The second sentence of the fifth paragraph on Page 14 was changed to read, "Results of these surveys, presented in Table D.4-3, showed..." Table D.4-3 was added to the CR to provide the removable contamination survey results for the confirmation plots within SG5. Similarly, the last sentence of the third paragraph on Page 9 was edited to read, "Results of these surveys, presented in Table D.3-2, showed..." Table D.3-2 was added to the CR to provide the removable contamination survey results for the confirmation plots within SG1.
8.	Section 2.1.2, Page 15, Figures 2-6 & 2-7		Suggest adding some brief text describing each scene since there are differences between the two that may not be obvious. Also, these images were taken on the same day implying substantial earth moving was done in a short period of time. Were the excavations backfilled that quickly?	These photographs (Figures 2-6 and 2-7) were taken from different vantage points. Therefore, the excavation appears inconsistent between photographs. The purpose of including Figure 2-6 in this section was to show some of the large debris removed from Zone 4, during excavation. This figure was moved to new Appendix I, and description was included in the new appendix text. A cross reference for Appendix I was added to the end of the fourth paragraph on Page 14.
9.	Section 2.1.2, Page 16, Figure 2-8		For consistency in the document, it is appropriate to include a "during Excavation image" similar that for Zone 4.	Figure 2-6 (during excavation of Zone 4) was moved to the new Appendix I. See response to Comment #8.

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
10.	Section 3.1, Page 18, Various Paragraphs		a. Add additional descriptive detail about the mechanical equipment and operational techniques employed to remove the contaminated soil, stockpile it, prevent airborne dispersion, and place into containers. Describe briefly how soil removal operations were spatially deployed to corrective action boundaries and zones as shown in Fig 1-2. b. Reference the photo/section of concrete debris undergoing demolition in Appendix D.	Added new Appendix I to document that provides this additional detail and discusses the concrete debris.

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

11.	Section 3.2, Page 20, 1st - 3rd Paragraphs		a. This document would convey a much more complete account of site closure by adding photos that show the technique used to add soil to the soft-sided containers and/or the containers being loaded onto flatbed trucks for transportation offsite. Why were such images not included such as that published by Public Affairs, "Environmental Remediation Work at TTR"? b. Second Paragraph: Provide reference(s) for the statements made. c. Third paragraph, First sentence: Site reconnaissance and radiological walkover surveys are not process knowledge. Should AMS data be added to this section? d. Paragraphs appear to be out of order and should be placed in chronological order, such as place the last sentence of paragraph three after the first sentence of paragraph one; move paragraph two to the first place in this section; last paragraph should be moved up because it is the most concise description of Section 3.2. It is also not necessary to repeat "TCLP" for each waste class, use it once, then list the RCRA constituents.	a. Added new Appendix I to document that provides additional detail. b. Samples used for waste characterization include all sample results reported in the CADD/CAP. This source is referenced in the revised section. c. and d. Rewrote entire section to satisfy concern: "This waste was characterized based on analytical soil sample results presented in Appendix K of the CADD/CAP (DOE/EMNV, 2017a). The samples were submitted for the following radiochemical analysis: gamma spectroscopy, isotopic americium, isotopic plutonium, and isotopic uranium. These radiochemical results verified that there were several radioisotopes that exceed the Table 4-2 limits of the NNSS Radiological Control Manual (NNSA/NFO, 2012). Therefore, the waste was characterized as LLW. Historical surface soil samples collected in 1996 from within the CSII radiological plume were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) volatile organic compounds, TCLP semivolatile organic compounds, TCLP metals, TCLP herbicides, and TCLP pesticides (NNSA/NSO, 2004). These sample results verified that no *Resource Conservation and Recovery Act* (RCRA) regulated hazardous constituents were present. Therefore, the waste has been characterized as non-hazardous, non-hydrocarbon impacted, and non-PCB contaminated. Excavated soil and debris from corrective actions was containerized into 422 7-m^3 bulk soft-sided containers. The 422 waste containers were shipped in 211 truck shipments for disposal to the Area 5 RWMC in accordance with the requirements in the *Nevada National Security Site Waste Acceptance Criteria* (NNSSWAC) (NNSA/NFO, 2016b)." Added reference: "U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office. 2004. *Corrective Action Decision Document for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion (TTR),* DOE/NV--895-Rev. 1. Las Vegas, NV."

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
12.	Section 4.0, Page 21, 1st Paragraph		Second sentence should state, "COCs above FALs no longer exist ....", down-range terrain and areas outside CABs (may) still contain COCs but below FALs. The fifth sentence more correctly states this. It should probably be noted that downrange and surrounding GZ, soil contamination inside the CA fence may still present below FALs; warrants some description of what the levels are approximately, relative to background and where.	The second sentence of this section was replaced with: "Although residual contamination below FALs remains at the CSII site (Figure 4-1), verification results demonstrate that COCs (contaminants present at concentrations greater than FALs) no longer exist within CAU 413." The following was added at the end of the first paragraph of Section 4.0: "Figure 4-1 shows a composite radiation survey representing residual radioactivity conditions at the CSII site following corrective actions." Inserted new Figure 4-1.
13.	Section 4.1.7.1, Page 30, 2nd Paragraph		This should probably be written in past tense to describe use of FIDLER data as decision support for CAU 413 closure.	Replaced the word "are" with "were" in this sentence.
14.	Section 4.2, Page 31, 1st Paragraph		FFACO URs may not technically be required, however there should be some discussion about current knowledge and assumptions about future land use and land use restrictions for military use.	Inserted the following at the end of the paragraph: "The corrective actions for CAU 413 are based on the assumption that activities at this site will be limited to those that are industrial in nature and that the U.S. Air Force (USAF) will maintain controlled access (i.e., restrict public access and residential use). Should the future land use change such that these assumptions are no longer valid, additional evaluation may be necessary."
15.	Section 5.0, Page 32, 1st Paragraph		Third sentence: Insert "within SG1 and SG5" after "exceeding FALs".	Inserted "within SG1 and SG5" at the end of the sentence.

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
16.	Section 5.0, Page 32, 2nd Paragraph		Second sentence: "...pre-corrective action fencing was restored and signs will be posted." Clarify/expand on this statement as to the reason(s). Third sentence: It has been previously indicated in FFACO meetings that revegetation at CAU 413 post-closure was not planned. Please explain this discrepancy.	That is correct, there is no FFACO basis for the signs, for restoring the fences, or for re-seeding. These activities were not planned in the approved CADD/CAP. Replaced the second and third sentences in this paragraph with "As a BMP, the fencing will be restored at USAF request."
17.	Section D.1.0, Page D-1, 4th Paragraph		First sentence: There are no data presented demonstrating that HCA conditions are no longer present at SG1; Fig. D.3-1 appears to show post-removal FIDLER surveys stopping at corrective action boundaries, not "extending out to a minimum of 2 m beyond each excavated boundary." Table D.3-1 presents highly summarized data with little explanation or methodological detail. This appendix and much of the document needs additional documentary and descriptive detail. The amount of detail need not be exhaustive or recapitulate technical details from CAIP and site history; it should however be sufficient for a reader not closely familiar with the CAU 413 planning and the site work conducted to understand how conclusions in this CR were reached and justified and how site operations were conducted.	Removable contamination survey results were added to the document within Tables D.3-2 and D.4-3. Figure D.3-1 was updated to show the FIDLER data 2 m beyond the boundaries. Inserted after the first sentence of this paragraph: "This information was used to resolve DQO decisions that are discussed in detail in the DQA presented in Section 4.1."

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
18.	Section D.2.1, Page D-2, 1st Paragraph		a. First sentence: specify each zone where surveys were conducted following soil removal. b. Provide an analysis and/or brief discussion of the effects of soil excavation/removal on radionuclide FALs based on a comparison between before-and-after FIDLER data sets from each zone. Simply presenting the 'after' data does not provide an adequate narrative about the very large soil removal operations. c. Third sentence: "...performed in conjunction with...GPS...": Was GPS used to accurately guide soil excavation and removal, and post-removal FIDLER surveys to ensure CABs were properly excavated and all areas exceeding FAL were identified and removed? Were the pre-excavation FIDLER line survey coordinates used to accurately revisit the excavated area to ensure the same areas previously mapped above FAL were excavated? Methodological disclosure/description in sufficient detail in this CR is needed to document the work that was done in the field and the information that was used for decision making.	a. The first sentence of Section D.2.1 was changed to read, "FIDLER surveys were conducted within excavated zones 0, 1a, 1b, 2, 3, 4, and 6 following soil/debris removal." b. and c. Added to the end of the paragraph: "Results of the pre-corrective action FIDLER surveys are presented in Figure D.2-1 for comparison. Figure D.2-1 also shows the initial CABs as presented in the CADD/CAP. The final CABs following completion of the corrective actions are shown in Figure D.2-2." Added Figures D.2-1 and D.2-2. The information needed to resolve DQO decisions is discussed in detail in the DQA presented in Section 4.1.

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
19.	Section D.2.2, Page D-2, 1st and 2nd Paragraphs		a. First sentence: Should this sentence state that sampling was conducted at locations determined from FIDLER surveys at the highest areas of post-excavation residual radioactivity? b. Second paragraph, Second sentence: Reference the table number, not just the appendix.	a. Replaced the first sentence with "Soil sampling within both SG1 and SG5 at CAU 413 was conducted at judgmental locations, determined from the highest results of the FIDLER surveys at each excavated zone." b. Replaced "Appendix H" with "Table H.1-1".
20.	Section D.2.3, Page D-3, 1st Paragraph		Do HCA survey locations coincide with the Sample Plots shown in Figure D.3-1? Clarify. Add HCA survey locations to an appropriate figure. As previously noted, HCA survey results (pre-and-post soil removal) must be summarized in this document.	Replaced second sentence with "These surveys were conducted within the boundaries of each verification soil sample plot (see Figures D.3-2 and D.3-3)." Removable contamination survey results were added to the document within Tables D.3-2 and D.4-3.

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location	11. Type[a]	12. Comment	13. Comment Response
21. Section D.2.5, Page D-4, 2nd Paragraph		a. The inhalation modelling section beginning with the paragraph 2 must be placed under a new subheading because it is not related to action levels routinely calculated for radiological FAL annual dose for a specific FFACO exposure scenario and is not based any apparent "Comparison to Action Levels." Alternatively, consider placing this content in an appendix. b. First sentence: Provide a reference to the communication/correspondence from AF to DOE on the subject of modelling inhalation dose resulting from ordnance drop into the area near sample location XO8. Clarify whether NDEP was notified of this request. c. First sentence: Clarify in this sentence that this dose model was based on the post-removal ordnance drop into the area of maximum residual contamination. d. Model assumptions: Is this based on a COTS product or were the results produced by self-determining calculations (add reference as necessary)? Please categorize the type of Quality Assurance data and the results involved in the model (decision support, etc.). e. Explain: How is inhalation to the maximally exposed individual accounted for if the contaminated plume contents are assumed to remain in suspension above the ground with no deposition?	a. Agree that this is not relevant to FFACO action levels or decisions. Removed the inadvertent bomb discussion from this section and inserted a new Appendix J with this supplemental information. (attached) b. This was a verbal request. c. Clarified text as requested. d. The estimate uses simple and very conservative calculations that are described in more detail in the new Appendix J. e. Because of conservative and simplistic assumptions as mentioned in the comment, any receptor at any distance is exposed to the same contamination. As explained in the text, they inhale the dust loading in the cloud during the time that they are in the cloud as it passes by given the very calm wind speed.

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
22.	Section D.2.5, Page D-5, Table D.2-1		Suggest retitle: "Inhalation Dose to Maximally Exposed Individual from Ordnance Detonation at Maximum Residual Contamination at CS II"	Retitled the table: "Potential Inhalation Dose from Ordnance Detonation at CSII Location of Maximum Residual Contamination" (now Table J.2-1).
23.	Section D.3.1, Page D-6, 1st Paragraph		a. Second sentence: It is unclear why a fact about operational hours is presented, but there are no photos presented showing much more important operations of waste packages being filled and placed on flatbed trailers. b. Third sentence: Define "maximally exposed CS II worker"; what "maximum TLD results" are being referred to? If worker exposure statements are to be included in this document, more methodological detail/documentation are required to demonstrate dose estimates.	a. and b. Agree that this information is not pertinent to resolving the DQO decisions. Deleted the second, third, and fourth sentences. Added new Appendix I with the requested additional information.
24.	Section D.3.1.2, Page D-8, Table D.3-1		For each sample location, the associated post-excavation FIDLER measurement(s) used to bias that sample must be added to this table. As previously suggested, it would greatly improve this CR to include a graphical or tabular comparison of pre-and-post FIDLER survey data over SG-1 & SG-5; this was done for geophysical data in Figure D.4-3.	As prescribed in the CADD/CAP, the highest FIDLER readings were used to bias the sample locations. To better show that the highest relative readings were used to select sample plot locations, Figures D.3-2 and D.3-3 were added to show the data with higher resolution. Added to the end of the first sentence in Section D.3.1.2: "(Figures D.3-2 and D.3-3)"

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
25.	Section D.3.1.2, Page D-8, 1st Paragraph		Last sentence: The estimated dose for sample X08 post excavation is stated as 19.8 mrem/yr, which is within approximately 5 mrem/yr of the FAL. What does accumulated measurement precision and accuracy variations mean in terms of the accuracy for this sample location?	Added the following to the end of Section D.2.4 Dose Calculations: "The calculation of TED using the methodologies described in the Soils RBCA document (NNSA/NFO, 2014) is not intended to represent the actual dose a receptor might receive from the release site. Due to the many conservative assumptions and the use of conservative input parameter values used in RESRAD for the calculation of RRMGs, the resulting calculated TED values are intentionally inflated. This overestimation of dose provides protection from making false-negative decision errors and compensates for uncertainties."
26.	Section D.3.1.3, Page D-8, 1st Paragraph		HCA survey measurements must be summarized in this document.	The removable contamination survey results were added to the CR as Table D.3-2. The last sentence of Section D.3.1.3 was replaced with: "Results of the surveys as presented in Table D.3-2 show that removable contamination does not meet HCA conditions (greater than 2,000 disintegrations per 100 square centimeters [dpm/100 cm^2] alpha)."
27.	Section D.4.0, Page D-9, 2nd Paragraph		Explain why conduit pipe containing electrical cable is not buried debris and why its discovery did not alter the CSM or trigger additional investigation for this zone (the document appears to be using an internal definition of "debris" as the basis for no corrective action or further verification).	See the response to Comment #4. Replaced the last three sentences with "This pipe is not within the CSM of SG5, as this study group was defined in the CAIP (NNSA/NFO, 2016) as the release of contaminants to subsurface soil from contaminated soil and debris that was collected and buried at GZ after the CSII test in 1963 and covered with "several feet of clean earth" (AEC/NVOO, 1964). Although the specific purpose of the electrical conduit pipe is unknown, based on process knowledge and field-screening results, there is no reason to suspect that it is contaminated or requires corrective action. However, as a BMP, the pipe was removed and disposed of at the Area 5 RWMC (Figure 2-4)."

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
28.	Section D.4.1.1., Page D-9, 1st Paragraph		Describe and interpret the significance of the objects in these photos in terms of what is known about the CS II test. Since there is no object for scale in Figure D.4-1, describe the objects size.	Added before the last sentence of this section: "The photos in these figures show two sides of the same debris items. These large pieces of debris are consistent with the CSM, as they were identified as portions of the original bunker that were buried near the GZ. Additional information about these items and the removal and disposal process is presented in Appendix I."
29.	Section D.4.1.2, Page D-12, Figure D.4-3		Last sentence in Section D.4.1.2 states post-removal figure indicates no areas of buried debris; however, close examination indicates higher than 'background' channel 1 response in Zone 5 and two areas of elevated response nearby. Explain. Also, please add Channel response data to Pre-removal figure for comparison.	Replaced sentence with "Figure D.4-4 shows the post-excavation results obtained using a Geonics EM61-MK2A high-sensitivity, high-resolution, time domain metal detector. The data collected do not indicate the presence of any further disposal areas. The anomalies seen in Zone 5 are due to a length of metal conduit that was left in place. The remaining anomalies of interest, numbered 1 through 6 on Figure D.4-4, represent scattered pieces of metallic debris either on the surface or just below the surface. Table D.4-1 lists the anomalies shown in Figure D.4-4. The table gives the location, Channel 1 instrument response, and depth estimated for each anomaly. The depths were estimated using the Geonics DAT61MK2 software. As seen in Table D.4-1, the deepest estimated depth of burial was 0.27 m. The anomalies indicate the presence of scattered pieces of metallic debris and do not indicate the presence of any additional disposal areas. Although the metal conduit pipe and the uncontaminated debris items did not require corrective action, they were removed and disposed of as LLW at the Area 5 RWMC as a BMP. Therefore, the anomalies associated with the conduit pipe and the uncontaminated debris items shown in Figure D.4-4 are no longer present at the site." Added Figure D.4-4 and added Table D.4-1.

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
30.	Section D.4.1.4, Page D-11, 1st Paragraph		Second sentence: Were the location of these sample plots biased by selecting the highest post-excavation FIDLER measurements? Clarify.	Replaced the second sentence with "One sample plot was placed at the location of the highest remaining radioactivity following completion of corrective actions within Zones 4 and 6 (Figure D.3-3)."
31.	Section D.4.1.4, Page D-14, Table D.4-1		For each sample location, its associated post-excavation FIDLER measurement(s) used to bias that sample must be added to this table. As previously suggested, it would greatly improve this CR to include a graphical or tabular comparison of pre-and-post FIDLER survey data over SG-5; this was done for geophysical data in Figure D.4-3.	As prescribed in the CADD/CAP, the highest FIDLER readings were used to bias the sample locations. To better show that the highest relative readings were used, Figure D.4-4 was replaced with Figure D.3-3 that shows the data with higher resolution.
32.	Section D-4.1.5, Page D-14, 1st Paragraph		HCA survey measurements must be summarized in this document.	The removable contamination survey results were added to the CR as Table D.4-3. The last sentence of Section D.4.1.5 was replaced with: "Results of the surveys as presented in Table D.4-3 show that removable contamination does not meet HCA conditions (greater than 2,000 dpm/100 cm^2 alpha)."

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

NEVADA ENVIRONMENTAL MANAGEMENT OPERATIONS ACTIVITY
DOCUMENT REVIEW SHEET

1. Document Title/Number: Draft Closure Report for Corrective Action Unit 413: Clean Slate II Plutonium Dispersion, Tonopah Test Range, Nevada	2. Document Date: August 2018
3. Revision Number: 0	4. Originator/Organization: Navarro
5. Responsible DOE NNSA/NFO Activity Lead:	6. Date Comments Due: September 3, 2018
7. Review Criteria: Full	
8. Reviewer/Organization Phone No.: Chris Andres and Scott Page, (702) 486-2850 ext. 232 and ext. 237	9. Reviewer's Signature:

10. Comment Number/Location		11. Type[a]	12. Comment	13. Comment Response
33.	General		In addition to the aforementioned NDEP comments, the first paragraph of Section 1.2 was rewritten to better explain the scope of the Closure Report.	The first paragraph of Section 1.2 was rewritten as follows: "The scope of this CR is to provide the information identified in the CADD/CAP (DOE/EMNV, 2017a) as being necessary to resolve the corrective action DQO decision: 'Do contaminants of concern (COCs) remain following completion of the corrective action removal activities?' 'If COCs are not present in the remaining material following completion of the corrective action removal activities, further corrective action is not required.' As presented in the CADD/CAP, the resolution of the DQO decision for each excavated area was based on analytical soil sample results. The sample results presented herein demonstrate that COCs do not remain following completion of the corrective actions. Results from field instrument for the detection of low-energy radiation (FIDLER) surveys, removable contamination surveys (i.e., stomp and tromp surveys), visual surveys, and geophysical surveys are also presented herein as supporting information. To ensure samples were collected in the areas most likely to contain a COC (if present), sample locations were selected at the most elevated relative FIDLER readings. Removable contamination surveys (stomp and tromp surveys) are reported for these sample locations to ensure high contamination area (HCA) conditions are not present. Visual, radiological, and geophysical surveys are discussed as used to guide excavation activities."

[a]Comment Types: M = Mandatory, S = Suggested.
Return Document Review Sheets to NNSA/NFO Environmental Management Operations Activity, Attn: QAC, M/S NSF 505

Library Distribution List

	Copies
U.S. Department of Energy Office of Scientific and Technical Information P.O. Box 62 Oak Ridge, TN 37831-0062	1 (Uncontrolled, electronic copy)
Southern Nevada Public Reading Facility c/o Nuclear Testing Archive P.O. Box 98521, M/S 400 Las Vegas, NV 89193-8521	2 (Uncontrolled, electronic copies)
Manager, Northern Nevada FFACO Public Reading Facility c/o Nevada State Library & Archives 100 N. Stewart Street Carson City, NV 89701-4285	1 (Uncontrolled, electronic copy)